United States
Department of
Agriculture

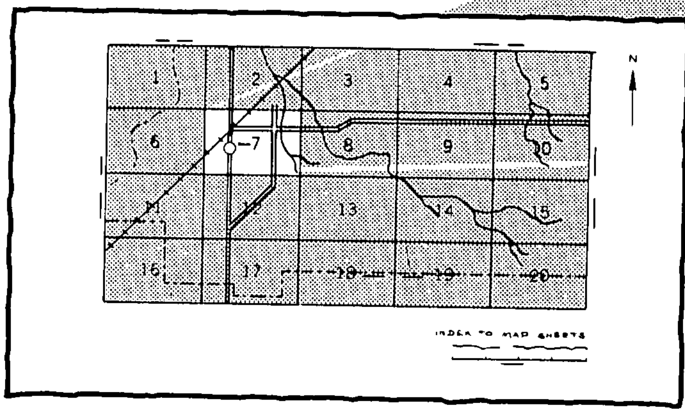
Soil
Conservation
Service

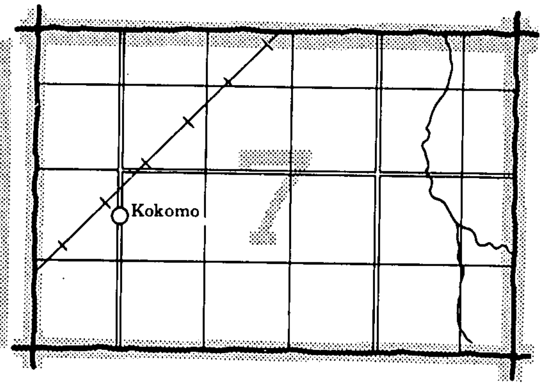
In Cooperation with
Tennessee Agricultural
Experiment Station

Soil Survey of Carroll County Tennessee

HOW TO USE

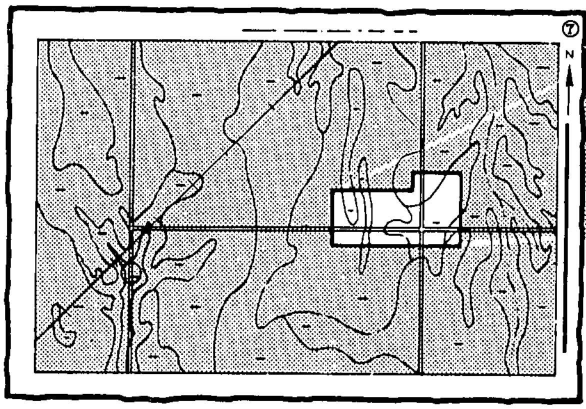
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

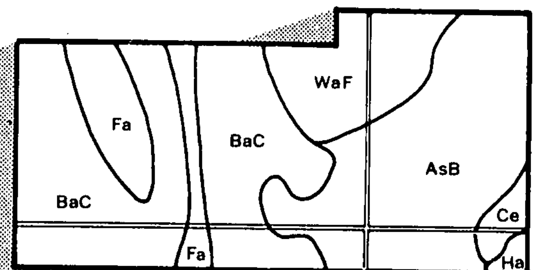




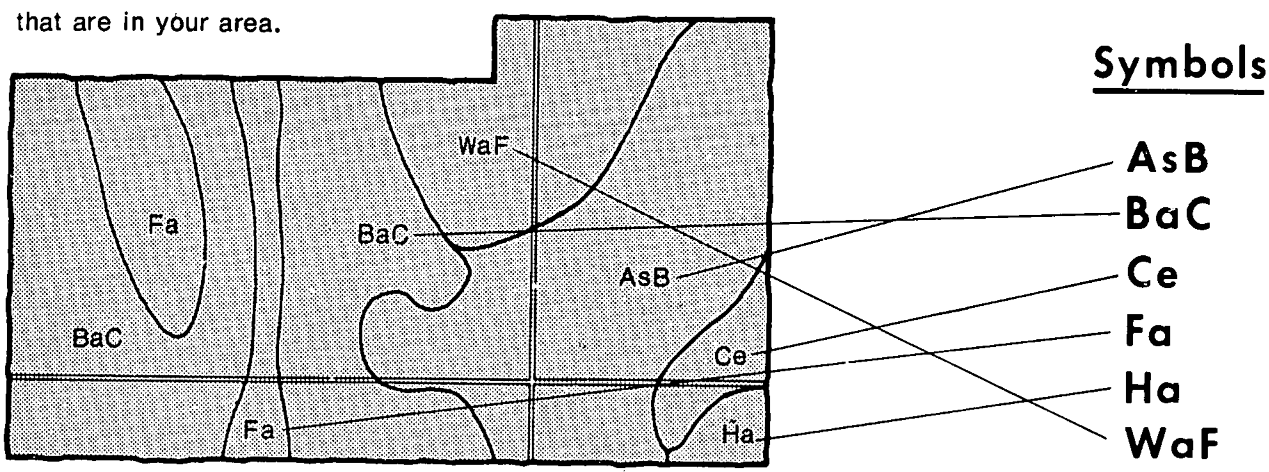
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



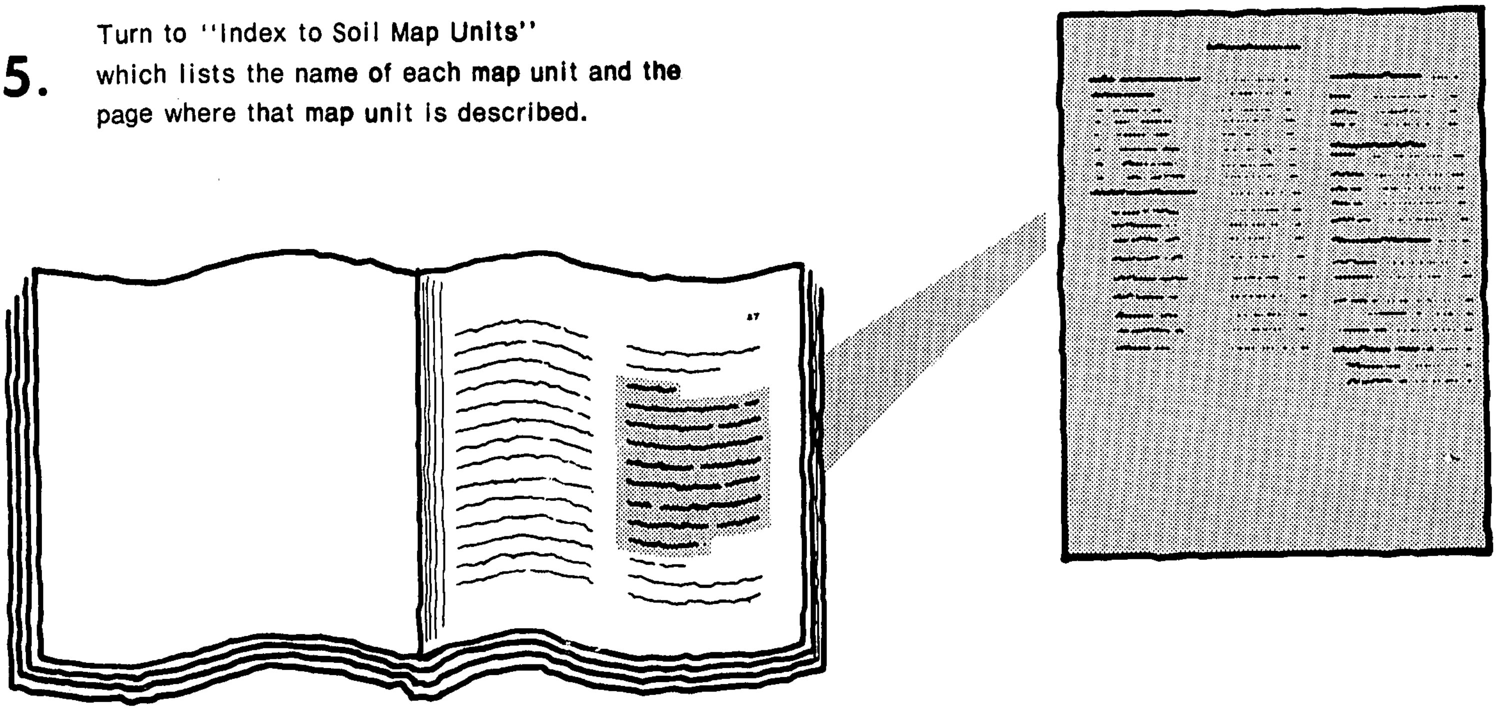


4. List the map unit symbols that are in your area.

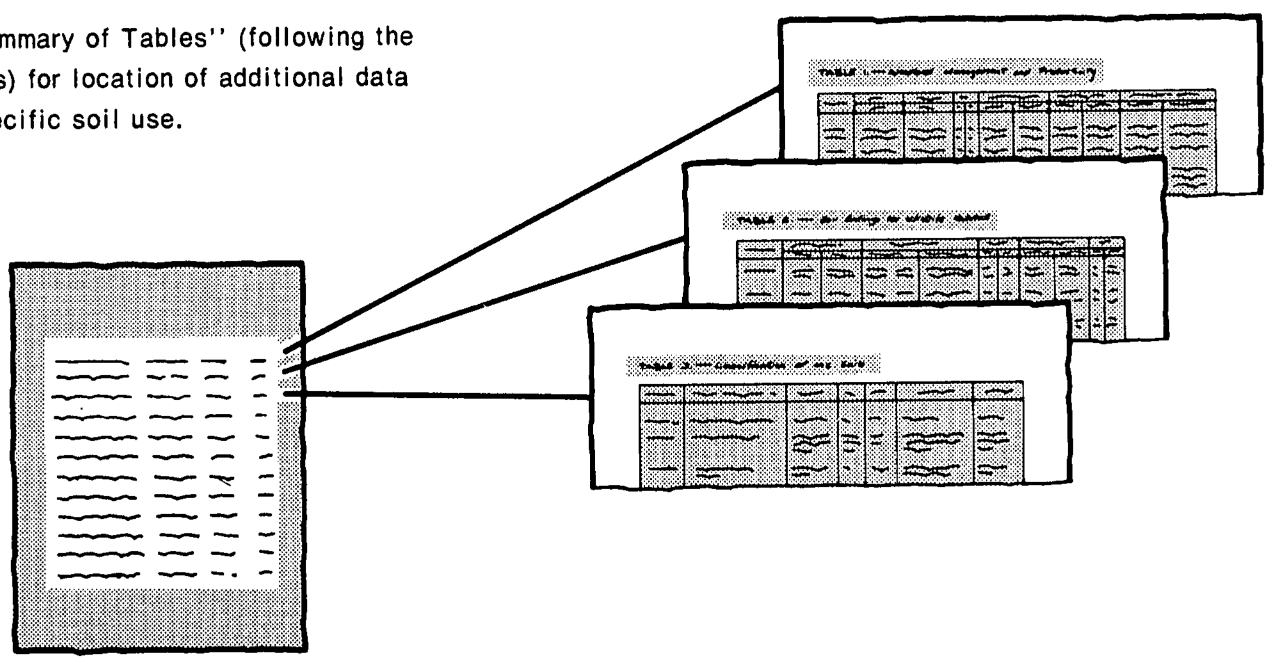


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1973-79. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1979. This survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station. It is part of the technical assistance furnished to the Carroll County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Farmsteads and fields in Carroll County, where soybeans, corn, and cotton are the principal row crops.

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Foreword

This soil survey contains information that can be used in land-planning programs in Carroll County, Tennessee. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Donald C Bivens

Donald C. Bivens
State Conservationist
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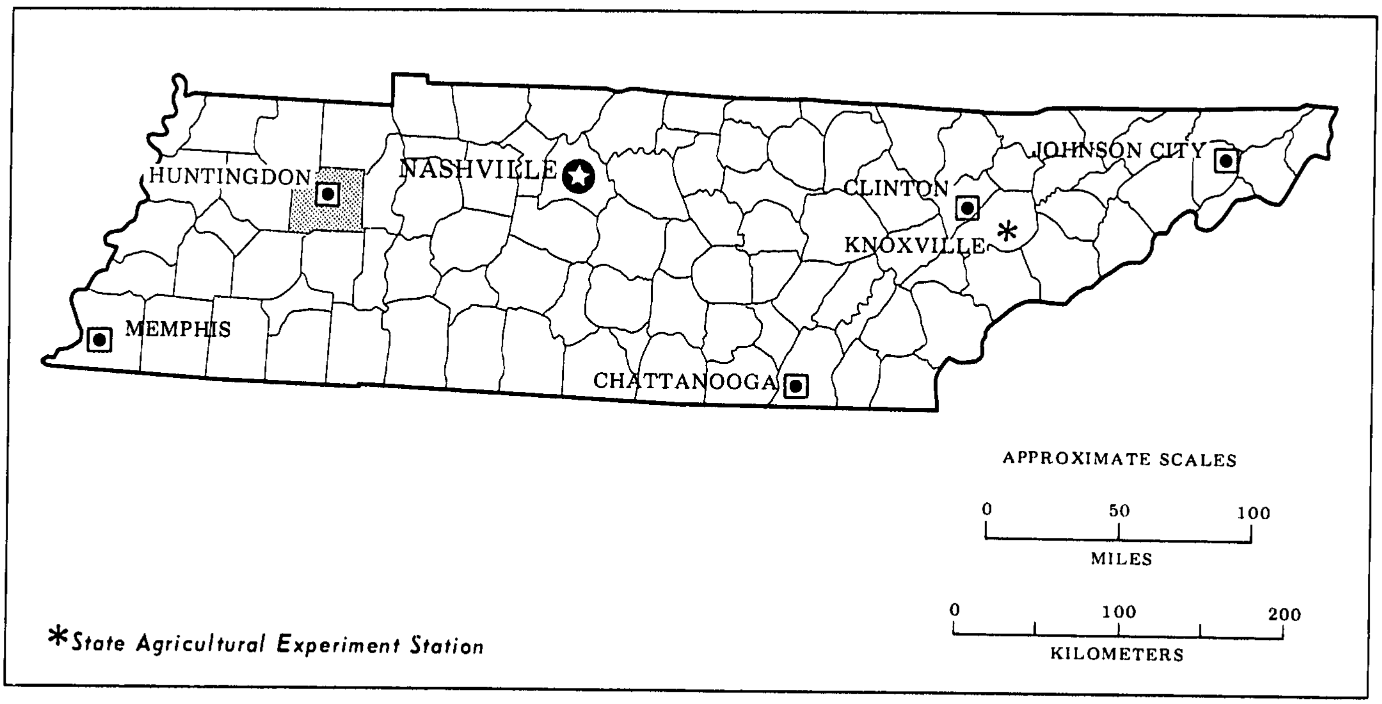

Location of Carroll County in Tennessee.

Soil survey of
Carroll County, Tennessee

By Charles L. Moore, Aaron B. Clement, Donald C. Dagnan
and Wesley C. Jackson, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with
Tennessee Agricultural Experiment Station

CARROLL COUNTY is in the west-central part of Tennessee. It is bounded on the north by Weakley and Henry Counties, on the west by Gibson County, on the south by Madison and Henderson Counties, and on the east by Decatur and Benton Counties.

Carroll County has a land area of 381,400 acres, or approximately 596 square miles. Huntingdon, the county seat, is the largest town in the county. In 1980, the population of the county was 28,223 according to preliminary census data.

The economy of the county is based mainly on the sale of farm products. Agriculture and related sales and services provide most of the employment in the county. Some county residents are employed by industry and government in Jackson, Tenn.

General nature of the county

The settlement, natural resources, farming, physiography, and climate of Carroll County are discussed in this section.

Settlement

Carroll County was created by an act of the General Assembly of the State of Tennessee, passed November 7, 1821. The first settlements were made at McLemoresville and Buena Vista about 1820. R.E.C. Dougherty, at whose house the county was organized, held the land office for west Tennessee at McLemoresville as early as 1820. The first entry of land at this office was made December 6, 1820, by David Gillespie. Other early settlements were at Huntingdon and McKenzie. Indians left the county about the same time the settlers appeared.

The unbroken forest had bears, wolves, panthers, deer, wildcats, and many smaller wild animals. These wild animals destroyed many of the domestic animals of the early settlers. The settlers hunted the wild animals for food and fur; as a result, most of these animals have become extinct in the county.

The first gristmill in west Tennessee was built in Carroll County by Isaac Blount on Blunt Creek around 1822. James Shields erected the first cotton-gin in the county on a place near Buena Vista. About 1931 the Huntingdon road leading to Jackson, Tenn., was constructed (*3*).

Natural resources

Soil is the most important natural resource in the county. Cultivated crops, hay crops, and livestock that graze the pastureland are marketable products that are derived from the soil.

In most of the county, water is adequate for domestic use and for watering livestock. Major sources of water are wells, springs, and ponds and lakes. Many farm ponds provide water for farm animals and wildlife and recreation.

Farming

The first settlers in Carroll County mainly raised crops for income, but later, livestock became a significant part of the economy. Cotton, grown by the early settlers, was the staple market product for many years. Corn, wheat, and oats were the principal grain crops raised for livestock feed. Tobacco was grown, mostly in the northern part of the county. Grain and vegetables were grown for home use and for sale in the nearby towns.

Farming is still the principal means of livelihood in Carroll County. According to the 1978 Census of

Agriculture, about 202,755 acres, or 53 percent of the county, is in farmland, which includes small wooded areas. The rest is in woodland, urban use, state and federal land, and transportation and utility facilities. The average size farm is 164 acres.

Most farming in Carroll County is diversified, producing both crops and livestock. Soybeans, corn, and wheat are the main crops; some cotton, oats, grain sorghum, and hay are grown. Livestock, mainly beef cattle and swine, are raised on many farms. The income from livestock is nearly equal to that of the income from crops. In the wetter areas, the use of improved crop varieties, the use of improved drainage and flood control measures on the flood plains, and other improved management techniques have led to expansion of farming and thus have reduced the acreage in woodland. Most of the farms are small enough for the family to do most of the work. On the larger farms, additional labor is hired. Most of the land is farmed by the owners. Most farmers apply fertilizer according to the needs of the crop and use chemicals to control weeds.

Physiography

Carroll County is in the East Gulf Coastal Plain section of the Coastal Plain province. Its slopes range from nearly level to steep. The divide between the Tennessee and Mississippi Rivers is in the middle part of the county.

The dominant geologic materials in which the soils formed are recent alluvium, Pleistocene loess, and Tertiary and Cretaceous sediments. The alluvium is mostly silty. The loess is thickest on gentle slopes in the western part of the county. There it ranges from 3 to 5 feet or more in thickness. It becomes thinner as slopes become steeper in the eastern part of the county. The Tertiary and Cretaceous sediments, referred to as Coastal Plain sediment, are mostly loamy but are clayey in a few places.

The eastern part of the county is steep to gently sloping and highly dissected by drainageways. This area is drained by the Big Sandy River, which flows northerly to the Tennessee River. Soils on the uplands are mostly well drained and loamy. Soils on the flood plains are mostly poorly drained and subject to flooding.

The central and western portions of the county are drained by the Obion River and its many tributaries, which flow into the Mississippi River. Some of the major tributaries are Beaver Creek, Crooked Creek, and Rutherford Fork. The topography is commonly gently sloping to moderately steep, but some areas have steep slopes. The uplands are highly dissected by drainageways, and the soils are well drained to moderately well drained. The flood plains are level to nearly level and are 2 miles wide in places. Soils on the flood plains are commonly poorly drained and subject to flooding.

Climate

Prepared by the National Climatic Center, Asheville, N.C.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Huntingdon, Tenn., in the period 1962 to 1979. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 37° F, and the average daily minimum temperature is 26°. The lowest temperature on record, which occurred at Huntingdon on January 24, 1963, is 23°. In summer the average temperature is 76°, and the average daily maximum temperature is 88°. The highest recorded temperature, which occurred at Huntingdon on August 20, 1962, is 101°.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 54.6 inches. Of this, 28 inches, or 51 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 15 inches. The heaviest 1-day rainfall during the period of record was 8.66 inches at Huntingdon on June 22, 1972. Thunderstorms occur on about 55 days each year, and most occur in summer.

Average seasonal snowfall is 7.3 inches. The greatest snow depth at any one time during the period of record was 13 inches. On an average of 5 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 70 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, early in spring.

How this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent

material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

General soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Descriptions of the general soil map units follow.

1. Waverly-Falaya-Collins

Level, poorly drained to moderately well drained soils; on flood plains

This map unit consists of level soils on flood plains of the rivers, creeks, and small drainageways. The drainage pattern is braided. Slope ranges from 0 to 2 percent.

This map unit makes up about 25 percent of the county. It is about 40 percent Waverly soils, 25 percent Falaya soils, and 10 percent Collins soils. The remaining 25 percent is minor soils.

Waverly soils are mostly in low positions on the flood plains. These soils are poorly drained, have a brown silt loam surface layer, and have a grayish silt loam subsoil.

Falaya soils are generally on the flood plains of the smaller creeks and near the channels of larger streams. These soils are somewhat poorly drained. The surface layer is dark grayish brown silt loam. The substratum to a depth of about 18 inches is brown silt loam that has gray and brown mottles. Below that is gray silt loam.

Collins soils are on the highest parts of the flood plains, along the upper reaches of the tributaries. These soils are moderately well drained. These soils are stratified, friable, brown silt loam to a depth of about 18 inches. Below that is brown stratified silt loam that has gray mottles.

Minor soils in this unit include the somewhat poorly drained Calloway soils and the moderately well drained Grenada soils on low uplands and old stream terraces.

Most of the cleared acreage of this unit is suitable for cultivation. Flooding and excess water are the main problems. However, water-tolerant summer annuals, such as soybeans and corn, produce high yields in most years. Tall fescue is suitable for pasture and hay. This unit is suitable for woodland. Good stands of water-tolerant hardwoods are on many areas that have insufficient surface drainage for cropping. The ponded areas and frequently flooded areas attract waterfowl, and the plants provide cover for deer and other wildlife.

Flooding and wetness are the main limitations for urban uses. Ponds are easily built to provide livestock water.

About 70 percent of this unit has been cleared and is used mainly for crops and pasture. Large acreages of bottom land hardwoods and some baldcypress remain in the lower parts of the flood plains. Farms in this unit average about 125 acres.

2. Lexington-Grenada-Loring

Gently sloping to strongly sloping, well drained and moderately well drained soils formed in moderately deep loess and underlying loamy Coastal Plain sediment; on uplands

This map unit consists of soils on high, broad uplands. The drainage pattern is dendritic with many small drainageways. The uplands consist of soils on gently sloping and sloping ridgetops and strongly sloping side slopes. Slope ranges from about 2 to 12 percent.

This unit makes up about 15 percent of the county. It is about 50 percent Lexington soils, 14 percent Grenada soils, and 10 percent Loring soils. The remaining 26 percent is minor soils.

Lexington soils generally are on the higher, smoother parts of the uplands. These soils are deep and well drained. They have a dark brown or dark yellowish brown silt loam surface layer. The upper part of the subsoil is strong brown silty clay loam. The middle part is strong brown loam and clay loam. The lower part is yellowish red sandy loam.

Grenada soils are on lower ridges and side slopes. These soils are moderately well drained. The surface layer is brown or yellowish brown silt loam. The upper part of the subsoil is yellowish brown silt loam. Below

that is a thin layer of light grayish brown silt loam that tongues into the lower part. The lower part of the subsoil is a mottled, silt loam fragipan.

Loring soils are on intermediate-level uplands between Lexington and Grenada soils. Loring soils are moderately well drained. The surface layer is brown or dark yellowish brown silt loam. The upper part of the subsoil is dark brown silt loam or strong brown silty clay loam and silt loam. The lower part is a mottled, silt loam fragipan.

Minor soils in this unit include the somewhat poorly drained Calloway soils on upland flats and in depressions and the moderately well drained Collins soils and somewhat poorly drained Falaya soils along narrow drainageways.

Most of the cleared acreage is suitable for pasture and hay. The gently sloping and sloping ridgetops and broad strips of bottom lands are suitable for cultivation. High yields can be produced; crops respond well to lime and fertilizer. If cultivated crops are grown, erosion is a serious problem. Steep areas are suitable for woodland, some recreational uses, and for use as habitat for wildlife.

Slope and high erodibility are the main limitations for urban uses. Considerable cutting and filling are required for highway construction, but the soil mantle is thick and easily cut. The Lexington soils are moderately permeable and are moderately suited for use as septic tank absorption fields.

About 90 percent of this unit has been cleared and is used for crops and pasture. A few small wooded areas remain on steeper slopes and along drainageways. Soybeans, corn, cotton, and hay are the main crops grown. Farms in this unit average about 100 acres.

3. Smithdale-Lexington-Providence

Steep to gently sloping, well drained and moderately well drained soils formed in loamy Coastal Plain sediment and in moderately deep loess and underlying loamy Coastal Plain sediment; on dissected uplands

This map unit consists of deep soils on highly dissected uplands. The landscape is one of narrow, winding, and branching ridgetops and moderately steep to steep, dissected side slopes that have common gullied areas. The drainage pattern is dendritic. Slope ranges from 2 to 35 percent.

This unit makes up about 50 percent of the county. It is about 35 percent Smithdale soils, 30 percent Lexington soils, and 20 percent Providence soils. The remaining 15 percent is minor soils.

Smithdale soils are on high, narrow ridgecrests and side slopes. They have a dark grayish brown and yellowish brown fine sandy loam surface layer and a yellowish red sandy clay loam subsoil. These soils are well drained.

Lexington soils are on broader ridgetops and side slopes. They have a dark brown silt loam surface layer. The upper part of the subsoil is strong brown silty clay loam; the middle part is strong brown loam and clay loam; and the lower part is yellowish red sandy loam. These soils are well drained.

Providence soils are in saddles and slight depressions and on uplands. They have a brown silt loam surface layer. The upper part of the subsoil is strong brown silty clay loam and silt loam. The middle part is a mottled, compact silt loam fragipan. The lower part is mottled red, gray, and brown loam. These soils are moderately well drained.

Minor soils in this unit include the moderately well drained Loring soils on uplands and Collins soils along drainageways.

Most of the smoother portions of the cleared areas are suitable for pasture and hay. Steeper and rougher areas are suitable for woodland, some recreational uses, and wildlife habitat. The broader ridgetops and strips along wider bottom lands are suitable for cultivation. If uplands are cultivated, erosion is a serious problem.

Slope, high erodibility, and difficulty in revegetating are the main limitations for urban uses. Deep cuts are required for highway construction, but the soil is deep and fairly easy to cut. Some thin layers of ironstone are in the underlying Coastal Plain sediment. This underlying material is very strongly acid and infertile. Cuts and fills usually require mulch, fertilizer, and lime for successful revegetation.

About 40 percent of this unit has been cleared. Much of the cleared portion is idle or has been planted with pines. Gullies are encroaching on many formerly cultivated areas. Soybeans, corn, hay, and pasture are the main crops. Mixed hardwoods are on most of the uncleared areas. Farms in this unit average about 150 acres.

4. Grenada-Sweatman

Gently sloping to steep, moderately well drained and well drained soils formed in moderately deep loess and underlying loamy and clayey Coastal Plain sediment and in clayey Coastal Plain sediment; on uplands

In this map unit, half of the soils are on highly dissected areas that have narrow winding ridges, moderately steep to steep side slopes, and deep narrow valleys. The remainder of the soils are on lower lying, gently sloping and sloping benches near the major flood plains. Slope ranges from 2 to 35 percent.

This unit makes up about 10 percent of the county. Grenada soils make up about 30 percent of the unit and Sweatman soils about 30 percent. The remaining 40 percent is minor soils.

Grenada soils are on smooth ridgetops and slightly concave parts of the benches. The surface layer is brown silt loam. The upper part of the subsoil is yellowish brown silt loam; and the lower part is a mottled, dense and very firm fragipan. These soils are moderately well drained.

Sweatman soils are on steeper side slopes and convex, narrow ridgetops. These soils are well drained. The surface layer is dark grayish brown and brown loam. The subsoil is yellowish red silty clay, clay, and silty clay loam that is underlain by weathered clay shale.

Minor soils include the well drained Lexington and Smithdale soils on uplands and the somewhat poorly drained Falaya and the poorly drained Waverly soils on narrow flood plains.

Most of the cleared acreage of this unit is suitable for pasture. Small areas of gently sloping soils are suited to cultivation. The rough, steep areas are suitable for woodland, some recreational uses, and habitat for wildlife.

High shrink-swell clays, susceptibility to earth slides and erosion, and slope are the main limitations for urban uses. Deep cuts are required for highway construction, and special design and treatment of cut faces is required to prevent caving. Revegetation is difficult because of the shaly, clayey substrata that are drouthy and very low in fertility. Septic tank absorption fields are not suited to these soils.

About half of this unit has been cleared. Most of the cleared land consists of Grenada soils and minor soils. Pasture, soybeans, corn, cotton, and hay are grown on some areas. Much of the cleared land is idle, and much has been severely damaged by erosion. Cutover hardwoods occupy much of the woodland. Some cleared land has been planted with pines. Farms in this unit average about 90 acres.

Detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Waverly silt loam, frequently flooded, is one of several phases in the Waverly series.

Some map units are made up of two or more major soils. These map units are called soil complexes.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Udorthents-Sweatman complex, gullied, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. They are too small to be shown and are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and suitabilities for many uses. The Glossary defines many of the terms used in describing the soils.

Descriptions of the detailed soil map units follow.

Ca—Calloway silt loam. This is a somewhat poorly drained, level soil that has a fragipan. This soil is in depressional upland areas and on low stream terraces. Slopes are 1 to 3 percent. Areas are 5 to 50 acres.

Typically, the surface layer is dark grayish brown silt loam about 7 inches thick. The upper part of the subsoil, to a depth of about 20 inches, is yellowish brown silt loam that has brown and gray mottles. The lower part, which extends to a depth of 60 inches or more, is a fragipan of grayish brown silt loam that has brown and gray mottles.

This soil is low in natural fertility and organic matter content. The soil is very strongly acid to medium acid in the upper part except where the surface layer has been limed. The lower part is strongly acid to slightly acid. A high water table is perched above the fragipan during periods of high rainfall. The fragipan limits penetration of air, water, and plant roots. This soil is somewhat drouthy during dry summers. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is moderate. The soil has good tilth and is easily worked except when the upper subsoil is saturated.

Included with this soil in the mapping are a few small areas of poorly drained soils in lower, concave positions and a few areas of moderately well drained soils on higher, slight ridges. Also included are a few small areas along drainageways that are occasionally flooded and that do not have a fragipan. Individual areas of the included soils are less than 1 acre, but together they make up about 10 percent of this unit.

Most areas of Calloway silt loam are used for corn, soybeans, pasture, and hay (fig. 1). This soil has fair suitability for corn, but it can produce good yields of

Figure 1.—Corn on Calloway silt loam (lighter area in middle background) and Grenada silt loam, 2 to 5 percent slopes, (in the foreground and background).

soybeans, milo, and other summer annuals, as well as crops that tolerate wetness, such as tall fescue and white clover. The soil has poor suitability for alfalfa and other deep-rooted perennials.

This soil has good suitability for most water-tolerant hardwoods. Wetness is the main limitation to use of equipment in managing and harvesting the tree crop. This limitation can be overcome by logging during the drier seasons.

This soil has poor suitability for most urban uses because of its seasonal wetness. This limitation can be overcome for some uses, but drainage is needed. The severe limitation for septic tank absorption fields can best be overcome in urban areas by using a central sewerage system.

This Calloway soil is in capability subclass IIw and in woodland suitability subclass 2w.

Co—Collins silt loam, occasionally flooded. This moderately well drained, level soil is on bottom land along streams. It formed in silty alluvial deposits washed primarily from loess-covered uplands. Areas parallel the streams and drainageways and are 5 to 50 acres. Slopes are less than 2 percent.

Typically, the surface layer is brown, very friable silt loam 8 inches thick. The underlying material to a depth of about 18 inches is brown silt loam and has thin horizontal bedding planes or strata. Below that is brown and gray, stratified silt loam.

This soil is medium in natural fertility, and organic matter content is low to moderate. This soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. It has a high water table 24 to 40 inches below the surface during wet periods. It is subject to occasional flooding and deposits of sediment. Permeability is moderate, available water capacity is very high, and the soil has very good tilth.

Included with this soil in mapping are a few areas of somewhat poorly drained soils. Also included are a few

small areas on stream banks and alluvial fans that have a brown sandy loam subsoil, and a few narrow strips that have a 5 to 15 inch loamy sand surface layer. Individual included areas are less than 2 acres, but together they make up about 15 percent of the map unit.

Most of the acreage is used as cropland. Corn and soybeans are the main crops grown (fig. 2). A few areas are used for pasture. This soil has good suitability for row crops, pasture, and hay. Brief flooding is a hazard in most areas used for cropland, but summer annuals are not damaged in most growing seasons. Crop stubble can be left on the soil to help prevent scouring by floodwaters. Channels can be maintained to help minimize damage from overflows.

This soil has good suitability for green ash, eastern cottonwood, and cherrybark oak. Plant competition is a major concern in woodland management.

This soil has severe limitations for most urban uses, because of the susceptibility to flooding. In some areas, channels or levees can control or prevent flooding, but such measures are expensive and in some places may be impractical.

This Collins soil is in capability subclass IIw and in woodland suitability subclass 1o.

Fa—Falaya silt loam, occasionally flooded. This level, somewhat poorly drained soil is on flood plains. Areas are long, narrow strips parallel to the stream channels and are 5 to 100 acres. Slopes are 0 to 2 percent.

Typically, the surface layer is dark grayish brown, very friable silt loam about 7 inches thick. The upper part of the substratum, to a depth of about 18 inches, is brown silt loam that has gray and brown mottles. The lower part to a depth of 60 inches or more is gray silt loam that has brown mottles.

This soil has high natural fertility and moderate to low organic matter content. The soil is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderate, and available water capacity is very high. The soil is subject to occasional flooding, and the high water table is within 20 inches of the surface during periods of high rainfall. The soil has good tilth.

Included with this soil in mapping are a few narrow strips along stream channels and on alluvial fans that contain more than 15 percent sand. The sand is mostly in thin strata of sandy loam alternating with silt loam, but in a few places, the surface layer is loamy sand 4 to 10 inches thick. Also included are a few small areas of

Figure 2.—Corn is well suited to Collins silt loam, occasionally flooded.

Waverly and Collins soils. Individual included areas are mostly less than 1 acre; together they make up about 15 percent of the map unit.

Most of the acreage is used to grow soybeans and corn. A few areas are in pasture and hay. This soil has good suitability for cropland. The main limitation is the hazard of flooding and the seasonal high water table. Small grains do well on areas that are protected from flooding.

This soil has good suitability for hay and pasture if water-tolerant plants, as fescue and white clover, or summer annuals, such as sudangrass or millet, are used. Deep-rooted perennials, such as alfalfa, are often damaged by floodwaters or the high water table.

This soil has good suitability for yellow-poplar and other bottom land hardwoods. Timber harvesting can be done during summer and fall to avoid rutting of the waterlogged soil during wet seasons.

This soil has severe limitations for most urban uses. The hazard of flooding and the seasonal high water table are severe limitations for most uses. In some places, flood protection and artificial drainage can be installed to help overcome these limitations, but such measures are often expensive. The seasonal high water table and hazard of flooding are severe limitations for septic tank absorption fields.

This Falaya soil is in capability subclass IIw and in woodland suitability subclass 1w.

GrB—Grenada silt loam, 2 to 5 percent slopes. This is a gently sloping, moderately well drained soil that has a fragipan. This soil is on broad upland saddles and on foot slopes. Areas are 2 to 75 acres.

Typically, the surface layer is brown, very friable silt loam about 7 inches thick. The upper part of the subsoil, to a depth of about 23 inches, is yellowish brown silt loam. The layer below that is light brownish gray silt loam about 3 inches thick that has tongues of gray silt extending down between prisms of a fragipan. The fragipan is silt loam mottled in shades of brown and gray. It extends to a depth of about 60 inches.

This soil is low in natural fertility and organic matter content. The soil is medium acid to very strongly acid throughout except where the surface layer has been limed. A high water table is perched above the fragipan during periods of high rainfall. Permeability is slow within the fragipan and moderate above the fragipan. Available water capacity is moderate to high. The soil has good tilth, and the root zone above the fragipan is moderately deep and easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Loring soils on slightly higher knolls and a few areas of Calloway soils on slightly lower, concave slopes. Also included are a few areas of severely eroded Grenada soils. Individual included areas are generally less than 1 acre, but together they make up about 15 percent of the map unit.

Most of the acreage is used as cropland. A few areas are in pasture and hay, and a few acres remain in woodland. This soil has good suitability for row crops and small grains. Erosion is a hazard, but contour cultivation, terracing, minimum tillage, and use of cover crops can minimize this hazard.

This soil has good suitability for hay and pasture. Pasture crops respond to lime, fertilizer, and weed control. The seasonal high water table is usually perched above the fragipan. The fragipan limits the rooting depth of alfalfa, and alfalfa stands are often shortlived on this soil.

The suitability of this soil for loblolly pine, shortleaf pine, cherrybark oak, white oak, and sweetgum is fair. There are no significant limitations for woodland use or management.

This soil has fair to poor suitability for most urban uses. The seasonal perched water table is the major limitation for most uses, but proper design and construction of buildings, roads, and other structures can help overcome this limitation. The suitability of this soil for septic tank absorption fields is poor. The seasonal perched water table and slow permeability are severe limitations that are impractical to overcome.

This Grenada soil is in capability subclass IIe and in woodland suitability subclass 3o.

GrC3—Grenada silt loam, 5 to 8 percent slopes, severely eroded. This is a sloping, moderately well drained soil that has a fragipan. This soil is on uplands. Areas are 5 to 50 acres.

Typically, the surface layer is yellowish brown, friable silt loam about 6 inches thick. The subsoil to a depth of about 14 inches is yellowish brown silt loam. The layer below that is about 3 inches of gray silt loam that has tongues of gray silt extending deep into the underlying fragipan. The fragipan is silt loam mottled in shades of brown and gray. It extends to a depth of about 60 inches or more.

This soil is low in natural fertility and organic matter content. The soil is medium acid to very strongly acid throughout except where the surface layer has been limed. Erosion has removed the original plow layer and the upper part of the subsoil, and the present plow layer has poor tilth. This soil is subject to crusting following rainfall, and seedling mortality is high. Small gullies are in some areas. The soil is slowly permeable within the fragipan and moderately permeable above the fragipan. Available water capacity is moderate. The depth to which roots easily penetrate is limited to the friable soil material above the fragipan.

Included with this soil in the mapping are a few small areas of Loring soils and a few small areas of less severely eroded Grenada soils. Individual included areas are less than 2 acres, but together they make up about 15 percent of the map unit.

Most of this soil is in row crops, pasture, and hay. A few areas are idle. This soil has poor suitability for cropland. If row crops are grown continuously, soil erosion can result, often causing gullies and loss of the friable upper subsoil.

The suitability of this soil is good for pasture and hay. Continuous sod cover helps protect the soil from further erosion. Alfalfa plants are difficult to establish on this soil and are usually shortlived.

This soil has fair suitability for loblolly pine, shortleaf pine, cherrybark oak, white oak, and sweetgum. There are no significant limitations to woodland use or management. Harvesting should be done when the soil is dry to minimize rutting and erosion.

The suitability of this soil for most urban uses is fair to poor. The seasonal high water table is the major limitation for most uses. However, proper design and construction of buildings, roads, and other structures can help overcome this limitation. The suitability of this soil for septic tank absorption fields is poor. The slow permeability of the soil and seasonal high water table are severe limitations that are difficult to overcome.

This Grenada soil is in capability subclass IVe and in woodland suitability subclass 3o.

LeB—Lexington silt loam, 2 to 5 percent slopes. This well drained, gently sloping soil is on broad ridgetops. It formed in 2 to 4 feet of loess and the underlying loamy Coastal Plain sediment. Areas are 5 to 75 acres.

Typically, the surface layer is dark brown, very friable silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 33 inches, is strong brown silty clay loam. The lower part is strong brown loam and clay loam and yellowish red sandy loam to a depth of about 62 inches.

This soil has medium natural fertility and low organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderate in the upper part, and moderately rapid in the lower part. The soil has moderate to high available water capacity, and the root zone is deep and easily penetrated by plant roots.

Included with this soil in the mapping are a few small, slightly concave areas of Providence soils. Also included are a few small areas of Loring soils. Individual included areas are generally less than 2 acres, but together they make up about 15 percent of the map unit.

Most of the acreage of this soil is used for cotton, corn, soybeans, hay, and pasture. The soil has good suitability for cultivated crops, small grains, hay, and pasture. If this soil is cultivated, erosion is a hazard; but minimum tillage, terracing, contour farming, and use of cover crops can help control erosion.

This soil has fair suitability for yellow-poplar, cherrybark oak, loblolly pine, and most other commonly grown trees. There are no significant limitations to woodland use and management.

The suitability of this soil for most urban uses is good. The hazard of erosion is the main limitation, but it can be easily overcome by proper design and construction of roads, buildings, and other structures. The suitability of this soil for septic tank absorption fields is fair.

This Lexington soil is in capability subclass IIe and in woodland suitability subclass 3o.

LeC2—Lexington silt loam, 5 to 8 percent slopes, eroded. This well drained, sloping soil is on broad, slightly convex uplands. It formed in 2 to 3 feet of loess and the underlying loamy Coastal Plain sediment. Areas are 5 to 50 acres.

Typically, the surface layer is dark yellowish brown, friable silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 25 inches, is strong brown silty clay loam. The lower part from 25 to about 62 inches is yellowish red clay loam and red sandy loam.

This soil has medium natural fertility, and organic matter content is low. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderate in the upper part, and in the lower part it is moderately rapid. Available water capacity is moderate, and the root zone is deep and easily penetrated by plant roots. Erosion has removed most of the original surface layer; the remaining surface layer crusts and has poor tilth. The seedling mortality rate is high except when soil moisture content is optimum.

Included with this soil in the mapping are a few small areas of Providence, Smithdale, and Loring soils. Individual included areas are less than 2 acres, but together they make up about 15 percent of the map unit.

This soil is used for corn, soybeans, tobacco, pasture, and hay. A few areas are idle. The suitability for crops is fair. Crop rotations that include 1 year of a row crop followed by 3 years or more of hay or pasture are needed. If this soil is cultivated, erosion is a serious hazard. Minimizing tillage, terracing, contour farming, and using cover crops can help control erosion. Returning crop residue to the soil increases the organic matter content of the surface layer and improves tilth.

The suitability for hay and pasture is good. Grasses and legumes respond well to adequate lime, fertilizer, and weed control.

The suitability is fair for yellow-poplar, cherrybark oak, loblolly pine, and most other commonly grown trees. There are no significant limitations for woodland use and management.

The suitability of this soil for most urban uses is good. The hazard of erosion is a limitation, but this can be overcome by proper design and construction. Suitability of this soil for use as septic tank absorption fields is fair.

This Lexington soil is in capability subclass IVe and in woodland suitability subclass 3o.

LeD2—Lexington silt loam, 8 to 12 percent slopes, eroded. This strongly sloping soil is on upland side slopes. It formed in moderately deep loess and in the underlying loamy Coastal Plain deposits. Areas are 5 to 75 acres.

Typically, the surface layer is dark yellowish brown, friable silt loam about 4 inches thick. The subsoil is strong brown silty clay loam to a depth of about 24 inches. The material below that is yellowish red clay loam and red sandy loam.

This soil has medium to low natural fertility, and organic matter content is low. This soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderate in the upper part of the subsoil and moderately rapid in the lower part. Available water capacity is moderate. The root zone is deep and friable. Erosion has removed most of the original surface layer. The remaining surface layer has poor tilth. The seedling mortality rate is high except when soil moisture content is optimum.

Included with this soil in mapping are a few small areas of Smithdale soils and gullied areas. Individual included areas are generally smaller than 2 acres, but together they make up about 15 percent of the map unit.

Most areas of this soil are idle or in unimproved pasture. However, several areas are in cropland, and some fields are in improved pasture.

The suitability of this soil for hay and pasture is fair. If this soil is cultivated, it has a severe hazard of erosion. Continuous sod cover is needed to help prevent further erosion damage and to produce satisfactory crops of pasture or hay. Pasture plants respond well to fertilizer and lime.

This soil has fair suitability for cherrybark oak, sweetgum, and loblolly pine. There are no significant limitations for woodland use and management.

The suitability of this soil for most urban uses is fair. Slope and high erodibility are the main limitations. These limitations can be largely eliminated by proper design and construction. The suitability of this soil for use as septic tank absorption fields is fair.

This Lexington soil is in capability subclass VIe and in woodland suitability subclass 3o.

LoB—Loring silt loam, 2 to 5 percent slopes. This is a moderately well drained, gently sloping soil that has a fragipan. This soil is on broad ridgetops. Slopes are long and smooth. Areas are 5 to 75 acres.

Typically, the surface layer is brown, very friable silt loam about 6 inches thick. The subsoil is dark brown silt loam between depths of 6 and 26 inches. Below that to a depth of about 62 inches is a fragipan of strong brown silt loam that has mottles in shades of gray and brown.

This soil has medium natural fertility, and organic matter content is low. The soil is medium acid to very strongly acid throughout except where the surface layer has been limed. Permeability is moderate above the fragipan, and in the fragipan it is moderately slow. Available water capacity is moderate to high. The soil has good tilth. The root zone above the fragipan is moderately deep and easily penetrated by plant roots.

Included with this soil in mapping are small spots of Grenada and Lexington soils. Also included are small areas of Loring soils on slopes slightly steeper than 5 percent and on some severely eroded areas. The included soils make up about 20 percent of the map unit, but individual areas are generally less than 1 acre.

Most of the acreage is used as cropland, but some is used for pasture and hay. A few smaller, isolated areas are idle and reverting to woodland. This soil has good suitability for cropland. If cultivated crops are grown, erosion is a hazard. Minimum tillage, contour farming, terracing, and the use of cover crops can minimize this hazard.

The suitability of this soil for pasture and hay is good. Adequate fertilizer, lime, and weed control help maintain a vigorous stand and control erosion.

This soil has fair suitability for loblolly pine and yellow-poplar. Plant competition is a significant limitation for woodland use and management.

The suitability of this soil for most urban uses is good. The erosion hazard and moderately slow permeability in the fragipan are limitations. Proper design and construction of buildings, roads, and other structures can help overcome these limitations. Septic tank absorption fields can be enlarged to help offset the moderately slow permeability. Also, convex portions of the slope can be used for absorption fields to avoid concentration of water on the soil.

This Loring soil is in capability subclass IIe and in woodland suitability subclass 3o.

LoB3—Loring silt loam, 2 to 5 percent slopes, severely eroded. This is a moderately well drained, gently sloping soil that has a fragipan. This soil is on broad ridgetops. Slopes are long and smooth. Areas are 5 to 35 acres.

Typically, the surface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil is strong brown silty clay loam and silt loam to a depth of about 20 inches. The layer below that is a fragipan of mottled brown, gray, and yellow silt loam that extends to a depth of about 60 inches. Below that is massive, mottled gray and brown silt loam or silt, or, in places, reddish, loamy Coastal Plain sediment.

This soil has medium natural fertility. Organic matter content is low. The soil is medium acid to very strongly acid throughout except where the surface layer has been limed. Permeability is moderate above the fragipan, but it is moderately slow in the fragipan. Available water capacity is moderate. Erosion has removed the original surface layer and upper subsoil. The surface layer now has poor tilth. Seedling mortality is high except under optimum moisture conditions.

Included in mapping are a few small areas of Lexington, Providence, and Grenada soils. Individual included areas are mostly less than 1 acre each, but together they make up about 20 percent of the map unit.

Most of this soil is used as cropland. A few areas are in pasture and hay, and a few are idle. This soil has fair suitability for cropland. If the soil is cultivated, erosion control is important to help prevent further damage. Minimum tillage, contour farming, terracing, and use of cover crops help control erosion. Returning crop residue to the soil helps increase organic matter content in the surface layer and improve tilth.

The suitability of this soil for pasture and hay is good. A dense perennial sod can be maintained by adequate lime, fertilizer, and weed control. The sod protects the soil from further damage from erosion.

The suitability of this soil for loblolly pine and yellow-poplar is fair. Plant competition is a significant limitation to woodland use and management.

This soil has good suitability for most urban uses. The hazard of erosion and moderately slow permeability in the fragipan are limitations. Proper design and construction of buildings, roads, and other structures can help minimize these limitations. Septic tank absorption fields can be enlarged to help make up for the moderately slow permeability of this soil. Absorption fields usually perform better on convex portions of the slope.

This Loring soil is in capability subclass IIIe and in woodland suitability subclass 3o.

LoC3—Loring silt loam, 5 to 8 percent slopes, severely eroded. This is a moderately well drained, sloping soil that has a fragipan. This soil is on uplands. Slopes are long and smooth. Areas are 5 to 50 acres.

Typically, the surface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil to a depth of about 20 inches is strong brown silty clay loam and silt loam. The layer below that is a fragipan. The fragipan of mottled brown, yellow, and gray silt loam extends to a depth of about 60 inches. It is underlain by mottled gray and brown silt loam, or in places, by reddish, loamy Coastal Plain sediment.

This soil has medium natural fertility. It has low organic matter content. The soil is medium acid to strongly acid throughout except where the surface layer has been limed. Permeability is moderate above the fragipan, but it is moderately slow in the fragipan. The soil has moderate available water capacity because of the limited depth to the fragipan. The rooting depth is limited to the area above the fragipan. Erosion has removed most of the original surface layer and upper subsoil; the surface layer now has poor tilth. Seedling mortality is high except under optimum moisture conditions.

Included with this soil in the mapping are a few small areas of Grenada and Providence soils. Individual included areas are mostly less than 2 acres, but together they make up about 15 percent of this map unit.

Most areas of this soil are used as cropland. A few areas produce pasture and hay, and a few are idle. This soil has fair suitability for cropland. If cultivated crops are grown, erosion is a serious hazard. Minimum tillage, contour farming, terracing, and use of cover crops help control erosion. Returning residue to the soil improves tilth.

The suitability of this soil for pasture and hay is good. Lime, fertilizer, and weed control help maintain a dense, productive stand and help prevent erosion (fig. 3).

The soil has fair suitability for loblolly pine and yellow-poplar. Plant competition is a significant limitation to woodland use and management.

This soil has good suitability for most urban uses. The high erodibility and moderately slow permeability in the fragipan are limitations. They can be overcome by proper design and construction of roads, buildings, and other structures. Septic tank absorption fields can be enlarged to help overcome the moderately slow permeability of this soil.

This Loring soil is in capability subclass IIIe and in woodland suitability subclass 3o.

LoD3—Loring silt loam, 8 to 12 percent slopes, severely eroded. This is a moderately well drained, strongly sloping soil that has a fragipan in the lower subsoil. This soil is on upland side slopes. Areas are 5 to 100 acres.

Typically, the surface layer is yellowish brown, friable silt loam about 4 inches thick. The subsoil to a depth of 20 inches is strong brown silt loam. The layer below that is a fragipan. It is mottled brown, yellow, and gray silt loam to a depth of about 60 inches or more. The fragipan is underlain by mottled brown and gray silt loam. In places, reddish loamy Coastal Plain sediment is at depths of 60 to 70 inches.

This soil is low in natural fertility and organic matter content. The soil is medium acid to very strongly acid throughout except where the surface layer has been limed. Permeability above the fragipan is moderate, but it is moderately slow in the fragipan. The soil has moderate available water capacity because of the limited depth to the fragipan. Plants are subjected to a moisture deficit during prolonged dry spells. The few roots that penetrate the fragipan are concentrated along gray silt-filled cracks between prisms. Erosion has removed most of the original surface layer and upper subsoil, and the remaining surface layer has poor tilth. Stands of new crops are often poor if soil moisture is less than optimum.

Included with this soil in the mapping are a few small areas of Grenada and Providence soils. Individual included areas are mostly less than 2 acres, but together they are about 15 percent of the map unit.

Most areas of this soil are in cropland, pasture, or hay.

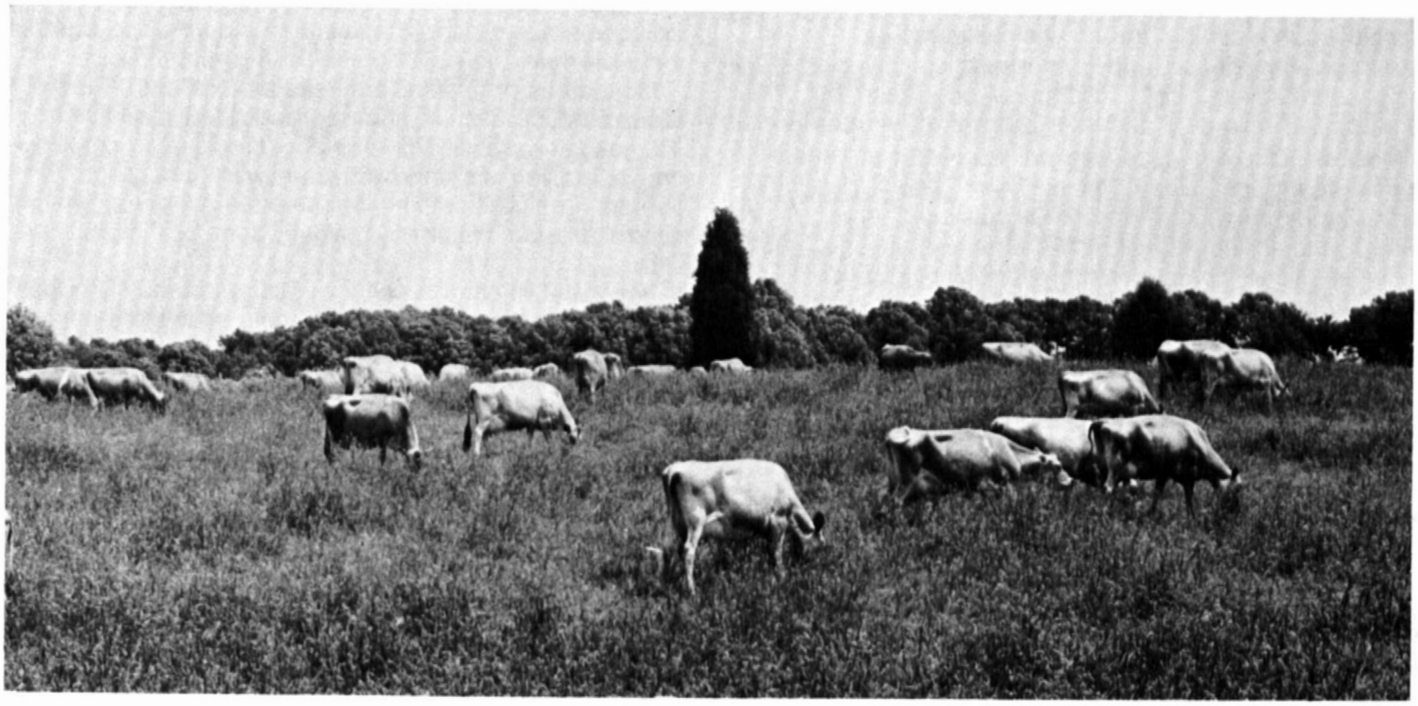

Figure 3.—Dairy cattle graze on a well managed pasture on Loring silt loam, 5 to 8 percent slopes, severely eroded.

A few areas are idle. This soil has poor suitability for row crops. Permanent vegetation is needed to protect the soil from further erosion. Returning plant residue to the soil improves water infiltration and helps reduce losses of plant nutrients.

The suitability of this soil for pasture and hay is good. Lime, fertilizer, and weed control help maintain a dense, productive stand and prevent further erosion.

The suitability of this soil for loblolly pine, and yellow-poplar is fair. Plant competition is a significant limitation to woodland use and management.

This soil has fair suitability for most urban uses. The hazard of erosion, moderately slow permeability in the fragipan, and strong slopes are limitations. These can be overcome by proper design and construction of roads, buildings, and other structures. This soil has poor suitability for use as septic tank absorption fields.

This Loring soil is in capability subclass IVe and in woodland suitability subclass 3o.

PrB—Providence silt loam, 2 to 5 percent slopes. This is a moderately well drained, gently sloping soil that has a fragipan. This soil is on broad, smooth uplands. Areas are 3 to 40 acres.

Typically, the surface layer is brown, very friable silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 22 inches, is friable, strong brown silty clay loam and silt loam. The layer below that is a fragipan of mottled brown and gray silt loam. It extends to a depth of about 34 inches. Below the fragipan, the subsoil is mottled red, gray, and brown loam that extends to a depth of 60 inches or more.

This soil is low in natural fertility and organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderate above the fragipan and moderately slow in the fragipan. Available water capacity is moderate. The root zone above the fragipan is moderately deep and easily penetrated by plant roots.

Included with this soil in mapping are small areas of Lexington soils in slightly higher, convex positions. Also included are a few areas of severely eroded Providence soils that have a fragipan at a depth of about 16 inches. Individual included areas are mostly less than 2 acres, but together they make up about 20 percent of the map unit.

Most areas of this soil are used for cropland, hay, and pasture. The suitability for these uses is good. Plants sometimes are affected by a moisture deficit during dry summer months. The soil above the fragipan is saturated by a perched water table during periods of heavy, prolonged rainfall. Deep-rooted perennials such as alfalfa have a short life on this soil. Erosion can be partly

prevented by minimum tillage, contour farming, terracing, and use of cover crops.

This soil has good suitability for loblolly pine, sweetgum, Shumard oak, and yellow-poplar. There are no significant limitations to woodland use and management.

This soil has fair to poor suitability for most urban uses. The main limitations are the seasonal wetness and moderately slow permeability in the fragipan. With proper design and construction, these limitations can be overcome.

The suitability of this soil for septic tank absorption fields is poor because of seasonal wetness and moderately slow permeability.

This Providence soil is in capability subclass IIe and in woodland suitability subclass 3o.

PrC2—Providence silt loam, 5 to 8 percent slopes, eroded. This is a moderately well drained, sloping soil that has a fragipan. This soil is on broad uplands. Areas are 3 to 30 acres.

Typically, the surface layer is yellowish brown, friable silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 16 inches, is strong brown silty clay loam. A fragipan is below this layer, and it extends to a depth of about 34 inches. It is mottled red, gray, and brown silt loam. Below the fragipan, the subsoil is mottled red, gray, and brown loam that extends to 60 inches or more.

This soil is low in natural fertility and organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderate above the fragipan and moderately slow in the fragipan. Available water capacity is moderate. Depth of rooting is limited to that part of the soil above the fragipan. Erosion has removed much of the original surface layer. The surface layer now has poor tilth. Seedling mortality is high except under optimum moisture conditions.

Included with this soil in the mapping are a few small areas of Lexington soils. Also included are a few small areas of Providence soils so severely eroded that only 5 to 12 inches of soil material remains above the fragipan. Individual included areas are less than 2 acres, but together they make up about 20 percent of the map unit.

Most of the acreage of this soil is used for row crops, hay, and pasture, but some areas are idle. The soil has fair suitability for pasture and hay. The soil is somewhat drouthy during dry summers, and a perched water table is above the fragipan during wet seasons.

The suitability for row crops is poor. If cultivated, the soil is easily damaged by further erosion. Erosion can be controlled by minimum tillage, contour farming, terracing, and maintenance of thick grass or legume cover.

Suitability for loblolly pine, sweetgum, yellow-poplar, and Shumard oak is fair. To minimize rut formation and erosion, logging should be done during summer and fall.

The suitability for most urban uses is fair or poor. The seasonal wetness and moderately slow permeability in the fragipan are limitations. These limitations can be offset for most uses by proper design and construction. This soil has poor suitability for use as septic tank absorption fields. Failures of systems are common because of seasonal wetness and the moderately slow permeability.

This Providence soil is in capability subclass IVe and in woodland suitability subclass 3o.

PrD2—Providence silt loam, 8 to 12 percent slopes, eroded. This is a strongly sloping, moderately well drained soil that has a fragipan. This soil is on concave upland side slopes. Areas are 3 to 30 acres.

Typically, the surface layer is yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 16 inches, is strong brown silty clay loam. The layer below that, to a depth of about 34 inches, is a mottled gray, brown, and red fragipan of brittle, firm silt loam. Below that to 60 inches or more the subsoil is mottled red, gray, and brown loam.

This soil is low in natural fertility and low in organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderate above the fragipan and moderately slow in the fragipan. Available water capacity is moderate. The rooting depth is limited to that part of the soil above the fragipan. Erosion has removed much of the original surface layer, and the surface layer now has weak structure and poor tilth. Seedbed preparation and obtaining a good stand are difficult except under optimum moisture conditions.

Included with this soil in the mapping are a few small areas of Lexington soils. Also included are a few small areas of severely eroded Providence soils that have only 5 to 15 inches of soil material left above the fragipan. Individual included areas are less than 2 acres, but together they make up about 20 percent of the map unit.

Most areas of this soil are in unimproved pasture or are idle. A few areas are in hay and improved pasture. The soil has fair suitability for pasture and hay. Because most roots and available moisture are confined to the soil above the fragipan, further erosion is highly detrimental. Permanent sod crops help protect this soil from further damage. Adequate fertilizer, lime, and weed control are necessary to maintain tall fescue, sericea lespedeza, or other forage plants.

The suitability of this soil for loblolly pine, sweetgum, yellow-poplar, and Shumard oak is fair. Timber harvesting during summer and fall helps prevent ruts and damage to the soil.

The suitability of this soil for most urban uses is fair to poor. The seasonal wetness, moderately slow permeability in the fragipan, and strong slopes are limitations. These can be overcome by proper design and construction but at considerable expense.

The suitability of this soil for septic tank absorption fields is poor. System failures are largely caused by the seasonal wetness and the moderately slow permeability.

This Providence soil is in capability subclass VIe and in woodland suitability subclass 3o.

SmD2—Smithdale fine sandy loam, 8 to 12 percent slopes, eroded. This well drained, strongly sloping soil is on upland side slopes and narrow ridgecrests. This soil formed in thick beds of loamy Coastal Plain sediments. It contains scattered gullies, and in some places, the plow layer is in former subsoil material. Areas are 5 to 40 acres.

Typically, the surface layer is strong brown, very friable fine sandy loam about 5 inches thick. In severely eroded places, it is yellowish red sandy clay loam. The subsoil to a depth of 60 inches or more is yellowish red sandy clay loam in the upper part and red sandy loam in the lower part.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability and the available water capacity are moderate. Tilth is only fair because of past erosion, but it can be improved by incorporating plant residue into the soil. Seedbed preparation and obtaining a good stand are somewhat difficult except under optimum moisture conditions. The root zone is deep and easily penetrated by plant roots.

Included with this soil in mapping are a few small areas of Lexington soils on narrow ridgetops. Also included are a few small areas of Collins soils along narrow drainageways. Individual included areas are generally less than 2 acres, but together they make up about 15 percent of the map unit.

Most of the acreage is idle and reverting to natural tree stands, or it is in unimproved pasture. Several acres are used for hay, and some are cultivated. Suitability for pasture and hay is fair. Lime and fertilizer, contour farming, and weed control help sustain yields and help prevent further damage by erosion.

The suitability of this soil is fair for loblolly pine (fig. 4). There are no significant limitations to woodland use and management.

The suitability of this soil is fair to poor for most urban uses. The strong slopes and hazard of erosion are limitations, but proper design and construction of structures can greatly reduce these limitations. Faces of

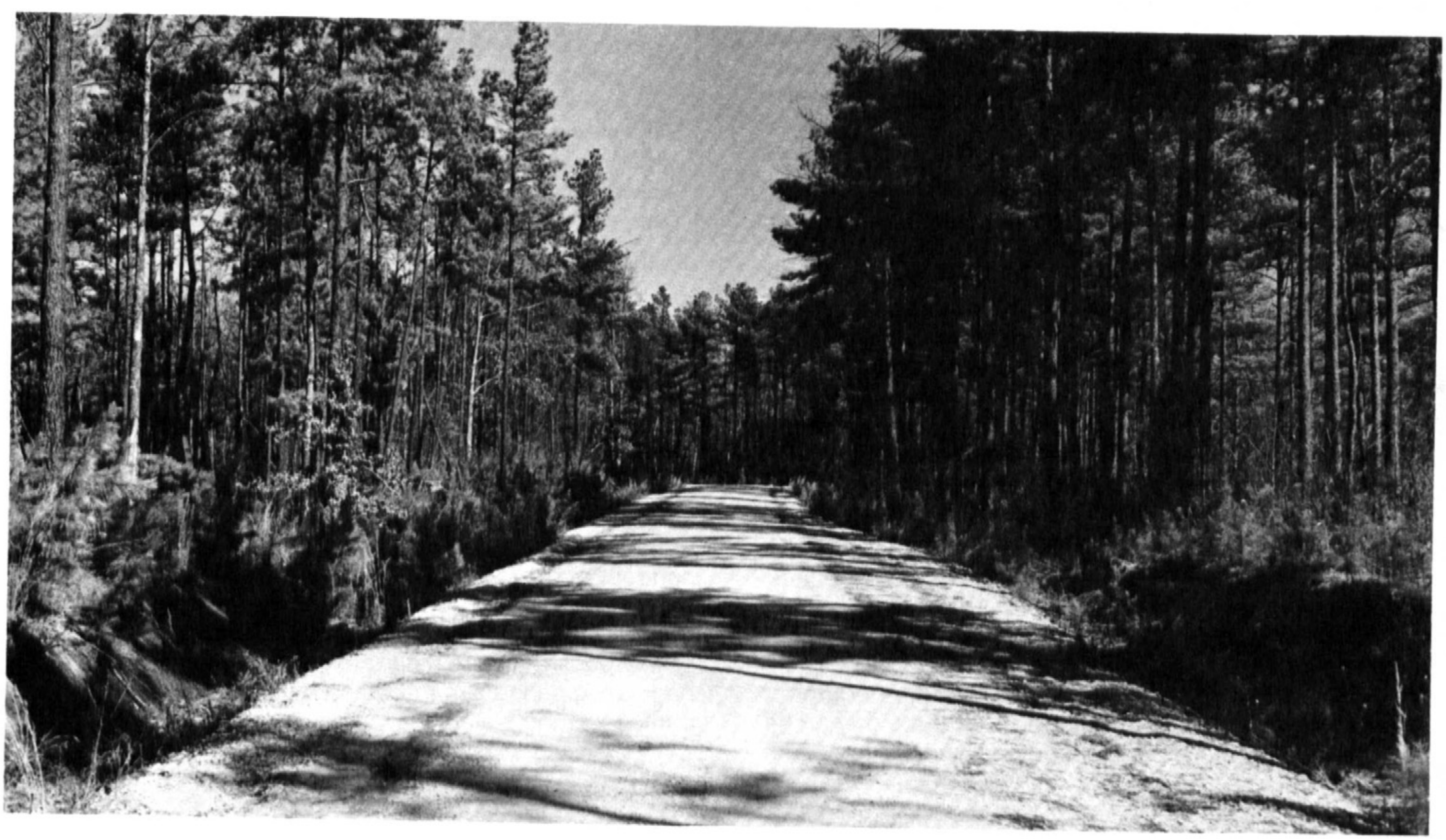

Figure 4.—Loblolly pine on Smithdale fine sandy loam, 8 to 12 percent slopes, eroded, on a narrow ridgetop.

road cuts are somewhat drouthy and have low fertility; lime, fertilizer, and mulch are usually required for successful revegetation.

This Smithdale soil is in capability subclass VIe and in woodland suitability subclass 3o.

SmE—Smithdale fine sandy loam, 12 to 20 percent slopes. This well drained, moderately steep soil is on uplands. This soil formed in thick beds of loamy Coastal Plain sediment. Areas are 2 to 75 acres.

Typically, the surface layer is dark grayish brown, very friable fine sandy loam about 3 inches thick. The subsurface layer, to a depth of about 11 inches, is light yellowish brown, very friable fine sandy loam. The subsoil is yellowish red sandy clay loam to a depth of about 43 inches. Below that to a depth of 70 inches or more is red sandy loam.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability and available water capacity are moderate. The soil has good tilth, and plant roots easily penetrate the deep root zone.

Included with this soil in mapping are a few small gullied areas and a few small areas of Collins soils along drainageways. Individual included areas are generally smaller than 2 acres, but together they make up about 15 percent of the map unit.

Most of the acreage of this soil is in hardwood timber. Several cleared acres are in pasture, and a few are used for corn, cotton, and soybeans. The suitability of this soil for pasture and hay is fair. Adequate lime and fertilizer help establish and maintain stands of grasses and legumes.

This soil has fair suitability for loblolly pine. There are no significant limitations for woodland use and management.

The suitability of this soil is fair to poor for most urban uses. The moderately steep slopes and the hazard of erosion are the main limitations for most uses. Proper design and construction of buildings, roads, and other structures can help minimize these limitations. Deep cuts are required for roads, and the exposed soil material is difficult to revegetate. Lime, fertilizer, and mulch are usually necessary for successful revegetation.

This Smithdale soil is in capability subclass VIe and in woodland suitability subclass 3o.

SmE3—Smithdale fine sandy loam, 12 to 20 percent slopes, severely eroded. This well drained, moderately steep soil is on upland side slopes. This soil formed in thick beds of loamy Coastal Plain material. Areas are 5 to 75 acres.

Typically, the surface layer is strong brown, very friable fine sandy loam about 5 inches thick. The subsoil extends to a depth of 60 inches or more. The upper part is yellowish red sandy clay loam, and the lower part is red sandy loam. Some areas have a surface layer of yellowish red sandy clay loam, and a few gullies are in some areas.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability and available water capacity are moderate. Erosion has removed much of the original surface layer; the present surface layer has poor tilth and poor structure. Seedbed preparation and obtaining a good stand are difficult except under optimum moisture conditions.

Included with this soil in mapping are a few small, narrow areas of Lexington soils on ridgetops, and a few narrow strips of Collins soils along small drainageways. Individual included areas are generally smaller than 2 acres, but together they make up about 20 percent of the map unit.

Most of the acreage of this soil has been cleared, and about half is used for cropland and unimproved pasture. The rest has returned to second growth hardwoods or has been planted to pine trees. A few areas are in improved pasture.

The suitability of this soil for pasture is fair, and suitability for hay is poor. The moderately steep slopes, severe hazard of erosion, and low fertility are limitations for these uses. Lime and fertilizer help establish and maintain stands of grasses and legumes.

The suitability of this soil for loblolly pine is fair. There are no significant limitations for woodland use and management.

The suitability of this soil is fair or poor for most urban uses. The moderately steep slopes and the hazard of further erosion are the main limitations. Deep cuts are required for roads, and revegetation is difficult. Proper design and construction of buildings, roads, and other structures can help overcome these limitations.

This Smithdale soil is in capability subclass VIIe and in woodland suitability subclass 3o.

SwD—Sweatman loam, 8 to 12 percent slopes. This strongly sloping, well drained soil is on short, irregular uplands. This soil formed in thick stratified, clayey and loamy Coastal Plain sediment. Areas are 5 to 30 acres.

Typically, the surface layer is brown, friable loam about 4 inches thick. The upper part of the subsoil, to a depth of about 22 inches, is yellowish red clay. Below that, to a depth of about 32 inches, the subsoil is strong brown clay that has brownish mottles. The substratum is soft brownish and grayish, clay shale. A few fragments of ironstone are on the surface and throughout the soil profile.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid except where the surface layer has been limed. Permeability is moderately slow, and available water capacity is moderate. Plant rooting depth is impeded by

the firm clayey subsoil, by the low nutrient level in the subsoil, and by lack of available moisture during dry summer months.

Included with this soil in mapping are a few small gullied areas of Sweatman soils. Individual included areas are generally smaller than 2 acres, but together they make up about 10 percent of the map unit.

Most areas of this soil are in unimproved pasture or are idle and slowly reverting to natural forest. A few areas are in improved pasture and hay, and a few areas are used for soybeans. Pines have been planted in some areas.

This soil has fair suitability for pasture and hay. If adequate lime and fertilizer are used, fair to good yields of grass can be grown. Maximum sod cover is important for adequate control of erosion.

The suitability of this soil for loblolly pine and shortleaf pine is fair. There are no significant limitations to woodland use and management.

The suitability of this soil for most urban uses is poor. The slope, limited depth, and slow permeability are limitations for most urban uses. Proper design and construction can help offset these limitations for most urban uses except septic tank absorption fields.

This Smithdale soil is in capability subclass VIe and in woodland suitability subclass 3c.

SwE—Sweatman loam, 12 to 20 percent slopes. This well drained, moderately steep soil is on short, irregular side slopes of narrow winding ridges. This soil formed in thick, stratified clayey Coastal Plain sediment. Areas are 5 to 50 acres.

Typically, the surface layer is friable loam about 8 inches thick. The upper 2 inches is dark grayish brown, and the lower 6 inches is brown. The subsoil to a depth of about 30 inches is yellowish red clay and silty clay that has pale brown mottles below about 18 inches. Strong brown silty clay loam is between depths of 30 and 36 inches. Below that is soft, acid clayey shale.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderately slow, and available water capacity is moderate.

Included with this soil in mapping are a few small areas of Smithdale soils and a few small gullied areas of Sweatman soils. Individual inclusions are generally less than 2 acres, but together they make up about 15 percent of the map unit.

Most of this soil is in forest. The soil has fair suitability for loblolly pine and shortleaf pine. There are no significant limitations to management.

This soil has poor suitability for pasture and hay. Using adequate lime and fertilizer can help produce fair yields of permanent pasture (fig. 5).

The suitability of this soil for most urban uses is poor. The moderately steep slopes, limited depth, and hazard of erosion are difficult and expensive to overcome for most urban uses. Road construction requires deep cuts

Figure 5.—A well managed pasture on Sweatman loam, 12 to 20 percent slopes. The trees in the middle foreground are on areas of severely eroded Sweatman soils.

Figure 6.—Soil slump in an area of Sweatman loam, 12 to 20 percent slopes. The clayey substratum, when saturated with water, has little resistance to soil slippage.

and filled areas, and exposed cuts may be subject to slump or landslides (fig. 6).

This Sweatman soil is in capability subclass VIIe and in woodland suitability subclass 3c.

SwE3—Sweatman loam, 12 to 20 percent slopes, severely eroded. This well drained, moderately steep soil is on short, irregular side slopes. This soil formed in thick, stratified, clayey and loamy Coastal Plain sediment. Nearly all the acreage has been cultivated, and in places, the plow layer is mostly in the former subsoil. Small rills and gullies are common. Areas are 5 to 50 acres.

Typically, the surface layer is yellowish brown, firm loam about 4 inches thick. The subsoil to a depth of about 22 inches is yellowish red clay. Below that to a depth of about 32 inches, it is strong brown clay that has a few soft gray fragments of shale. The substratum is soft, gray, acid clay shale.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout except where the surface layer has been limed. Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid.

Included with this soil in mapping are a few small areas of loamy soils. Individual included areas are generally smaller than 2 acres, but together they make up about 10 percent of the map unit.

Most of the acreage is idle, reverting to natural tree stands, or is in unimproved pasture. A few areas are in improved pasture. Pines have been planted on several acres. Erosion has left a surface layer that has poor structure and poor tilth. Preparing a seedbed and obtaining a good stand are difficult except under optimum moisture conditions.

The suitability of this soil for pasture and hay is poor. If adequate fertilizer and lime are used, fair yields of

pasture and hay can be obtained. Sod cover is important to help control further erosion.

The suitability of this soil for loblolly pine and shortleaf pine is fair. The moderately steep slopes and hazard of erosion are the main limitations to forest management, and these limitations can be easily overcome.

The suitability of this soil for most urban uses is poor. The moderately steep slopes, limited depth, and slow permeability are all limitations for most urban uses. Deep cuts and fills are necessary for road building, and cut faces are unstable and subject to slump and mudslides. The suitability of this soil for septic tank absorption fields is poor.

This Sweatman soil is in capability subclass VIIe and in woodland suitability subclass 4c.

Up—Udorthents-Pits complex. This map unit consists of spoil mounds and mine pits left from strip mining operations for extraction of ceramic clay, brick clay, and fuller's earth. Separating these areas at the scale used for mapping is impractical. Areas are 10 to about 150 acres.

Udorthents make up the spoil mounds. These mounds make up about 50 to 60 percent of the map unit. They consist of a mixture of Grenada and Sweatman soils and the clay, shale, and sandy clay cut from the Coastal Plain sediments under those soils. These spoil piles are irregular, and in most places, the material is several feet thick. The spoil material is very strongly acid. It has slow permeability and low available water capacity. The material is very low in natural fertility and organic matter content. Fragments of ironstone are common on and near the surface.

Pits make up about 30 to 40 percent of the map unit. They consist of straight-walled, crater-like depressions that were excavated 20 to 50 feet or more deep. The banks are nearly vertical, exposed substrata that are clayey and loamy Coastal Plain sediments. The pit floors are mostly dense, compact shaly clay, and in places, the floor has debris from the overburden. Fragments of ironstone are common. Several pits contain intermittent pools of water several feet deep.

The exposed material in the pits is very strongly acid and very low in natural fertility and organic matter content. Available water capacity is very low in most places. Permeability is slow. In most places, material favorable for root development is about 4 inches deep.

Included in mapping are a few small areas of Providence and Sweatman soils. Individual included areas are less than 2 acres, but together they make up about 10 percent of the map unit.

This map unit is largely barren. Most of the acreage has poor suitability for most agricultural uses. A few acres have been reclaimed and revegetated. Plant cover can be established in some areas. Lime, fertilizer, and mulch are needed.

Smoothing and benching can reduce erosion. Drouth resistant trees, such as loblolly pine, may help protect the surface from erosion.

This unit has poor suitability for most urban uses. The slow permeability, drouthiness, and hazard of landslides are major limitations to most uses.

This complex is not assigned to a capability class or to a woodland suitability subclass.

Us—Udorthents-Smithdale complex, gullied. This map unit consists of small areas of Udorthents and Smithdale soils that are so intermingled that mapping them separately is not practical at the scale used. These well drained, strongly sloping to steep soils are on side slopes. Slopes range from about 8 to 35 percent. Areas are 5 to 75 acres.

Udorthents make up about 50 to 70 percent of the map unit. They are in deep, loamy Coastal Plain sediment exposed by gully erosion. They are on side slopes and in bottoms of the gullies. The soil profile is variable, but in most places, it is reddish and yellowish sandy clay loam, sandy loam, and loamy sand to a depth of 60 inches or more. The gullies are about 10 to 40 feet in width and 5 to 12 feet in depth.

Smithdale soils make up about 20 to 40 percent of the map unit. They are on the remnant of the surface between the gullies. Typically, the surface layer, about 5 inches thick, is dark grayish brown, very friable fine sandy loam. The subsoil to a depth of 60 inches or more is yellowish red sandy clay loam and red sandy loam. In places, the surface layer is yellowish red sandy clay loam.

These soils are low in natural fertility and organic matter content. The soils are strongly acid or very strongly acid throughout. Permeability is moderate, and runoff is rapid. Available water capacity is moderate.

Included in mapping are a few small areas of soils that have a fragipan at a depth of 20 to 30 inches. They make up about 10 percent of the unit.

Most areas of these soils were once cultivated and then were abandoned as the gullies spread. Much of the acreage is now idle or has naturally reforested to a sparse growth of mixed hardwoods. Many areas, particularly in and around Natchez Trace State Park, have been planted to pine trees; the thinning cuttings of these trees are used in pulpwood.

These soils have poor suitability for most uses other than trees and habitat for wildlife. Major reclamation involves earth moving and reshaping measures and revegetating. Alternatives include planting pine trees on the existing irregular slopes and constructing grade stabilization structures or gully plugs to prevent further damage to nearby creek bottom lands.

This complex is in capability subclass VIIe. The Smithdale soils are in woodland suitability subclass 3o. Udorthents are not assigned to a woodland suitability subclass.

Uw—Udorthents-Sweatman complex, gullied. This map unit consists of small areas of Udorthents and Sweatman soils that are so intermingled that mapping them separately is not practical at the scale used. These strongly sloping to steep soils are on side slopes. Slopes range from about 8 to 35 percent. Areas are 5 to 50 acres.

The Udorthents make up about 50 to 60 percent of the map unit. They are in stratified, clayey and loamy Coastal Plain sediment that has been exposed by gully erosion. These soils are on side slopes and in bottoms of the gullies. The soil profile is variable, but in most places, it is yellowish red and strong brown stratified clay, sandy clay loam, and silt loam to a depth of 20 to 40 inches. The material below that is compact, partly weathered, acid clay shale. The lower sidewalls and floor of some gullies are entrenched in the partly weathered shale. The gullies are 10 to 25 feet wide and 4 to 8 feet deep.

The Sweatman soil makes up about 20 to 40 percent of the map unit. It is on the remnant of the surface between the gullies. Typically, the surface layer is brown, firm loam about 5 inches thick. The subsoil, to about 30 inches, is yellowish red clay that has fragments of gray clay shale in the lower part. The substratum is soft, acid clay shale that has lenses of loam or sandy loam.

These soils are low in natural fertility and organic matter content. They are strongly acid or very strongly acid throughout. Permeability is moderately slow, and available water capacity is moderate. Runoff is rapid.

Included in mapping are a few small gullied areas of Grenada soils. Individual included areas are generally less than 2 acres, but together they make up about 10 percent of the map unit.

Most areas of these soils are either idle or have naturally reforested to a sparse growth of hardwoods and cedar. Some former fields are in broomsedge, briers, and scattered cedar and hardwood saplings. A few areas have been replanted to pines.

These soils have poor suitability for most uses other than forest and habitat for wildlife. The drouthiness, low fertility, high clay content, and hazard of erosion are the main limitations for most uses.

These soils have fair suitability for loblolly pine and shortleaf pine. Trees can produce some pulpwood or saw timber as well as help protect these areas from further erosion.

This complex is in capability subclass VIIe and in woodland suitability subclass 4c.

Wf—Waverly silt loam, frequently flooded. This poorly drained, level soil is in the lowest positions of the flood plains of rivers and large creeks. The slightly depressional areas have no natural outlets and remain flooded from 3 to 6 months each year. Slopes are 0 to 2 percent. Areas are 5 to 500 acres or more.

Typically, the soil is gray, very friable silt loam to a depth of 60 inches or more. Fine stratification is present in most places.

This soil is subject to flooding during the winter and spring. A high water table is at or near the surface from early in winter until late in spring, and it is usually within 3 feet of the surface all year.

This soil is practically impossible to cultivate. The excess water restricts downward growth of plant roots and prevents aeration. The available water capacity is very high. Runoff is very slow. Organic matter content is low to moderate. The soil is low in natural fertility and is strongly acid or very strongly acid.

Included with this soil in mapping are a few narrow areas of somewhat better drained soils along sloughs and ditches. Also included are a few areas that have a sandy loam surface layer.

The suitability of this soil is poor for pasture and hay. Nearly all the acreage is wooded, and in some places, the bottom land hardwoods and some cypress have been killed by silt deposits or the high water table. Corrective drainage is impractical.

This soil has good suitability for eastern cottonwood, water oak, willow oak, sweetgum, and other water-tolerant trees. The main limitations are the severe hazard of flooding and the severe seedling mortality. Timber harvesting is restricted to dry periods in the summer or early in fall. Restocking of seedlings may be necessary.

This soil has severe limitations for most urban uses because of the hazard of flooding and the seasonal high water table.

This Waverly soil is in capability subclass Vw and in woodland suitability subclass 2w.

Wo—Waverly silt loam, occasionally flooded. This poorly drained, level soil is on low flood plains of the creeks and rivers. Slopes are 0 to 2 percent. Areas are 5 to 300 acres or more.

Typically, the surface layer is dark grayish brown, very friable silt loam about 7 inches thick. The substratum is gray silt loam, mottled in shades of yellow and brown to a depth of 60 inches.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout except where the surface layer has been limed.

Permeability is moderate, but the soil is subject to occasional flooding. A high water table is at or near the surface during winter and early in spring. Available water capacity is very high. This soil is low in natural fertility and organic matter content. Because of the poor aeration of the substratum, most plant roots are restricted to the upper few inches of this soil.

Included with this soil in mapping are a few small areas of Falaya soils and a few small areas near stream channels that have a surface layer of sandy loam or loamy sand, 8 to 20 inches thick. The included areas

make up about 10 percent of the map unit, but individual areas are mostly less than 1 acre.

Most of the acreage of this soil remains in bottom land hardwoods. Areas that have been cleared are used mostly for soybeans; a few fields are in pasture. This soil has fair suitability for row crops. Surface drainage is needed for such crops as soybeans, corn, and tall fescue. Crop failures caused by flooding during prolonged periods of rainfall are common. Drainage is improved by dikes or levees and ditches to remove excess water. Some rice is grown on this soil in nearby counties.

This soil has good suitability for eastern cottonwood, water oak, willow oak, sweetgum, and other water-tolerant trees. The main limitations are the severe seasonal conditions for use of harvesting equipment and the severe seedling mortality. Timber harvesting is restricted to dry periods in the summer or early in fall. Restocking of seedlings may be necessary.

This soil has severe limitations for most urban uses. The seasonal high water table and hazard of flooding are the main limitations.

This Waverly soil is in capability subclass IIIw and in woodland suitability subclass 2w.

Wp—Waverly silt loam, ponded. This poorly drained, level soil is on low terraces and in shallow depressions. Slopes are 0 to 2 percent. Areas are 5 to 100 acres.

The surface horizon is typically dark grayish brown, very friable silt loam that has gray mottles. It is about 8 inches thick. The material below that to a depth of about 60 inches is grayish brown and gray, weakly stratified silt loam mottled in shades of brown and yellow.

The soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout except where the surface layer has been limed.

Permeability is moderate, but the soil is subject to ponding; a high water table is at or near the surface during winter and early in spring. Available water capacity is very high. The soil is low in natural fertility, and the organic matter content is low to moderate. Because of the poor aeration in the substratum, most plant roots are limited to the upper few inches of this soil.

Included with this soil in mapping are a few small areas that have a fragipan in the lower part of the subsoil. Also included are a few small areas of Calloway soils on slight ridges. Individual included areas are mostly less than 2 acres, but together they make up about 15 percent of the map unit.

Most areas of this soil are used for soybeans. A few areas are in pasture, and some areas are in bottom land hardwoods. The soil has fair suitability for soybeans. Surface drainage is needed for such water-tolerant crops as soybeans and tall fescue. Delaying seedbed preparation until late in spring is common in years that have a high spring rainfall. Heavy rainfall in the fall can make harvesting difficult or impossible. Drainage is sometimes improved by drainage ditches and surface grading.

This soil has good suitability for eastern cottonwood, water oak, willow oak, sweetgum, and other water-tolerant trees. The main limitations are the severe wetness for harvesting and severe seedling mortality. Timber harvesting is restricted to dry periods in the summer or early in fall. Restocking of seedlings may be necessary.

This soil has poor suitability for most urban uses because of the ponding hazard and the seasonal high water table.

This Waverly soil is in capability subclass IVw and in woodland suitability subclass 2w.

Prime farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation. It also has favorable temperature and growing season, acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 143,680 acres or nearly 38 percent of Carroll County meets the soil requirements for prime farmland. Areas are scattered throughout the county but most are in the central part, mainly in map units 1, 2, and 3 of the

general soil map. Crops grown on this land, mainly corn and soybeans, account for most of the county's total agricultural income each year.

A trend in land use to industrial and urban uses in some parts of the county has been the loss of some prime farmland. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, drouthy, and difficult to cultivate, and usually less productive.

Soil map units that make up prime farmland in Carroll County are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

The map units in the following list meet the soil requirements for prime farmland except where the use is urban or built-up land.[1]

Ca—Calloway silt loam
Co—Collins silt loam, occasionally flooded
Fa—Falaya silt loam, occasionally flooded (where sufficient acreage for cropland)
GrB—Grenada silt loam, 2 to 5 percent slopes
LeB—Lexington silt loam, 2 to 5 percent slopes
LoB—Loring silt loam, 2 to 5 percent slopes
PrB—Providence silt loam, 2 to 5 percent slopes

[1] Urban and built-up land is defined as any contiguous unit of land 10 acres or more that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, public administrative sites, railroad yards, small parks, cemeteries, airports, golf courses, shoot ranges, and so forth.

Use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and suitabilities of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the suitabilities and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to the 1978 Census of Agriculture, a total of 135,700 acres in Carroll County was cropland. Of this amount, 98,001 acres was harvested cropland and 37,699 acres was pasture. The acreage for soybeans was 55,123 and for corn 22,800 acres. The acreage planted to soybeans has been increasing in recent years, and corn acreage has been decreasing.

Pasture and hay crops make up a significant acreage of the land cleared and in farms in the survey area. Most of the pasture and hay in the county consists of tall fescue and white clover with some areas of orchard grass and red clover. Orchardgrass and tall fescue are well suited for pasture on many of the soils in Carroll County. Legumes should be seeded with grasses during establishment of pasture. Also, they should be added to pure grass pastures to raise the quality of the forage. Latest information on pasture seeding and renovation can be obtained from local offices of the Cooperative Extension Service and the Soil Conservation Service.

Soil erosion is a serious problem in most of the county. Loss of soil through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils, such as Loring and Grenada soils, that have a layer in the subsoil that limits the depth of the root zone. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. Contouring, contour stripcropping, and conservation tillage farming are good erosion control practices in the county. A cropping system that keeps vegetative cover on the soil for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legume and grass forage crops in the cropping system reduce erosion on sloping land, also provide nitrogen, and improve soil tilth.

Soil drainage is a major management need on much of

the acreage in crops and pasture. Drainage is needed on flood plains, upland depressions, and foot slopes that are in an area receiving large quantities of water, either from runoff or from seepage.

Many soils on uplands are strongly or very strongly acid. If they have never been limed, applications of ground limestone are required to raise the pH level sufficiently for good growth of most field crops. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to apply.

In general, the soils in the county that are well suited to crops are also well suited to urban uses with the exception of areas subject to flooding. The data about specific soils in this soil survey can be used in planning land use. Potential productive capacity for farming should be weighed against soil limitations and suitability for non-farm uses.

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, animal manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have

other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity.

Woodland management and productivity

Joseph H. Paugh, forester, Soil Conservation Service, helped prepare this section.

Woodland occupies 153,000 acres, or 40 percent, of the total area of Carroll County. All but 20,000 acres of this woodland is in private ownership. Most of the publicly owned woodland is in Natchez Trace State Forest and Wildlife Management Area (*7*).

Oak-hickory, the most common forest type, is usually on the steeper upland soils. Oak-gum-cypress, the next most common type, is along rivers and streams where the soils are too wet for cultivation. The loblolly-shortleaf pine type is throughout the county, but the total acreage is small and is usually limited to eroded areas where it was planted.

Carroll County is an area of Tennessee where average woodland productivity is 42 cubic feet per acre per year. Potential productivity is 87 cubic feet per year. In general, the highest potential is in the flood plains where growth can reach 100 cubic feet per acre per year. In the uplands, the greatest potential is normally on the lower third of north- and east-facing slopes. Other values of woodland include wildlife habitat, recreation, natural beauty, and watershed protection.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w*, excessive water in or on the soil; *c*, clay in the upper part of the soil; and *o* indicates that limitations or restrictions are insignificant.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

Gerald L. Montgomery, biologist, Soil Conservation Service, helped prepare this section.

Carroll County has 13 recreation areas that offer several activities. Field sports and fishing are the most popular forms of recreation. Ninety-seven percent of the total recreational acreage is owned and operated by the State of Tennessee (*4*).

Based upon soils and other physical resources, Carroll County has moderate overall potential for recreational development (*6*). The potential is highest for vacation cabins, cottages and homesites, and hunting areas. Potential is moderate for picnicking, field sports areas, fishing waters, golf courses, camping areas, scenic areas, and vacation farms. Potential for water sports is low because large bodies of water are not present in the county.

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife habitat

Gerald L. Montgomery, biologist, Soil Conservation Service, helped prepare this section.

About 40 percent of Carroll County is in woodland, and about 50 percent is in openland (pasture and cropland). Wetlands are common in the county.

Common wildlife species found in woodland include white-tailed deer, gray squirrel, wild turkey, woodcock, thrushes, woodpeckers, gray fox, and raccoon. Species attracted to openland include bobwhite quail, mourning dove, meadowlark, coyote, and cottontail rabbit. Wildlife found in wetlands include wood duck, rails, herons, shorebirds, muskrat, beaver, and mink.

Deer populations in Carroll County are moderate and increasing; squirrel populations are moderate and stable. Turkey populations are presently low but are increasing; raccoon populations are high and stable. Quail populations are high and stable; rabbits are moderate and stable. Coyotes were rare until a few years ago, and populations are presently low but increasing rapidly. Beaver populations are moderate and increasing. Populations of waterfowl and other wetland species are moderate and stable.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, and wheat.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are common ragweed, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are shrub honeysuckle, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, baldcypress, and cedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattails, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations.

For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the suitability of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of sand, earthfill, and topsoil; (7) plan drainage systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building site development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Sanitary facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the

indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of stones are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction materials

Table 11 gives information about the soils as a source of roadfill, sand, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand. The ratings are based on soil properties and site features

that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand is a natural aggregate suitable for commercial use with a minimum of processing. Sand is used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or a layer of sand that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of stones or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of stones or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering index properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy soils are identified as SM and SC; silty and clayey soils as ML, CL, and MH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and chemical properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems,

septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Soil and water features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt are not considered flooding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 15.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*8*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 16, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning fluvial, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, mixed, acid, thermic Typic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*5*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*8*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Calloway series

The Calloway series consists of somewhat poorly drained, level soils that have a fragipan. These soils formed in thick deposits of loess or alluvium on broad upland flats and stream terraces. Slopes are 1 to 3 percent.

The Calloway soils are geographically associated with the Waverly and Grenada soils. Waverly soils, in depressions and on low flood plains, are poorly drained. Grenada soils, on higher lying ridges and side slopes, are moderately well drained.

Typical pedon of Calloway silt loam, 2 miles east of Huntingdon, 700 feet south of Buena Vista Road, and 100 feet south of Mt. Zion Church:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate fine and medium granular structure; very friable; many fine roots; medium acid; clear smooth boundary.

B21—7 to 10 inches; yellowish brown (10YR 5/4) silt loam; common fine faint light brownish gray and dark grayish brown mottles; weak fine and medium subangular blocky structure; friable; many fine roots; strongly acid; gradual smooth boundary.

B22—10 to 20 inches; yellowish brown (10YR 5/4) silt loam; common fine and medium distinct light brownish gray (10YR 6/2), and common fine and medium faint brown (7.5YR 4/4) and yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; common fine and medium dark brown and black concretions; very strongly acid; clear wavy boundary.

A'2—20 to 26 inches; light brownish gray (10YR 6/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few small and medium dark brown concretions; very strongly acid; gradual irregular boundary.

B'x—26 to 40 inches; grayish brown (10YR 5/2) silt loam; many medium and coarse distinct strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6), and many medium and coarse faint light brownish gray (10YR 6/2) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; very firm, compact and brittle; patchy clay films around concretions and on faces of some peds; 2-inch to 1/4-inch tongues of gray, friable silt between prisms; many medium and coarse black concretions; strongly acid; gradual wavy boundary.

B'3—40 to 60 inches; grayish brown (10YR 5/2) silt loam; common fine and medium distinct brownish yellow (10YR 6/6) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; firm; few patchy clay films on faces of peds; 2-inch to 1/4-inch tongues of gray, friable silt between prisms; strongly acid.

Depth to the fragipan ranges from 15 to 32 inches. Reaction is medium acid to very strongly acid in the upper part of the solum except where the surface layer has been limed. The lower part is strongly acid to slightly acid.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 to 3. In wooded areas, the upper 1 or 2 inches is very dark grayish brown or very dark gray.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 4 to 6. Texture is silt loam or silty clay loam. Clay content ranges from 18 to 30 percent. Few to many gray mottles are present.

The A'2 horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 to 3. Texture is silt loam or silt.

The B'x horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2 to 6. It has few to many grayish mottles, or the matrix is mottled gray, yellow, and brown. Texture is silt loam or silty clay loam. Prism interiors are brittle and firm or very firm. The grayish silt coatings between prisms are friable and, in most places, are thinner with increasing depth.

Collins series

The Collins series consists of level, moderately well drained soils that formed in recent silty alluvial deposits along stream and upland drainageways. These soils are subject to flooding, and the water table is within 24 to 40 inches of the surface during winter and early in spring. Slope is less than 2 percent.

The Collins soils are geographically closely associated with the Loring and Falaya soils. Loring soils, on upland ridges and side slopes, have a Bt horizon and a fragipan. Falaya soils, on lower portions of the flood plains, have matrix colors of chroma 2 or less within 20 inches of the surface.

Typical pedon of Collins silt loam, occasionally flooded, 2.5 miles east of Atwood, 0.6 mile south of U.S. Highway 70A, 100 feet east of the blacktop road, and 175 feet northwest of a house:

Ap—0 to 8 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; slightly acid; abrupt smooth boundary.

C1—8 to 18 inches; brown (10YR 4/3) silt loam; weak medium granular structure; thin horizontal strata; very friable; common fine roots; very strongly acid; clear smooth boundary.

C2—18 to 26 inches; brown (10YR 4/3) silt loam; common fine faint light brownish gray (10YR 6/2) mottles; massive; thin horizontal strata; very friable; common fine roots; very strongly acid; clear smooth boundary.

C3g—26 to 39 inches; brown (10YR 4/3 and 10YR 5/3) silt loam; many medium gray (10YR 6/1) mottles; massive; thin horizontal strata; friable; few fine roots; common fine very dark brown stains; very strongly acid; clear smooth boundary.

C4g—39 to 60 inches; gray (10YR 6/1) silt loam; common coarse brown (10YR 5/3), dark grayish brown (10YR 4/2), and yellowish brown (10YR 5/6) mottles; massive; weak horizontal strata; friable; common fine very dark brown stains; very strongly acid.

Reaction is strongly acid or very strongly acid throughout except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 4 and 5, and chroma of 2 through 4.

The C horizons have thin strata of silt loam in shades of brown mottled with shades of gray, to a depth of about 39 inches. Below this is gray, grayish brown, or light gray silt loam that has mottles in shades of brown. A few thin bands of silt, loam, or sandy loam are common below depths of about 20 inches.

Falaya series

The Falaya series consists of level, somewhat poorly drained soils on the flood plains. These soils formed in loess washed from uplands. The soils are subject to occasional flooding and are saturated late in winter and early in spring. Slopes are 0 to 2 percent.

Falaya soils are near the Collins and Waverly soils. Collins soils, nearer the stream channels, are moderately well drained. Waverly soils, in slight depressions, are poorly drained.

Typical pedon of Falaya silt loam, occasionally flooded, 1/2 mile north of U.S. Highway 70A, 100 feet west of Big Buck Road, and 500 feet south of Reedy Creek:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

C1—7 to 10 inches; brown (10YR 4/3) silt loam; common fine and medium faint dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2) mottles; weak fine granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

C2—10 to 18 inches; brown (10YR 4/3) silt loam; many medium and coarse distinct grayish brown (10YR 5/2) mottles; weak coarse granular and weak thin platy structure; friable; few fine roots; common very dark brown stains; strongly acid; clear smooth boundary.

C3g—18 to 60 inches; gray (10YR 6/1) silt loam; common medium distinct light olive brown (2.5Y 5/4) and dark yellowish brown (10YR 4/4) mottles; massive; friable; strongly acid.

Reaction is strongly acid or very strongly acid except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The C1 and C2 horizons have hue of 10YR, value of 4 or 5, and chroma of 3 or 4; mottles are in shades of gray and brown. Weak horizontal strata or bedding planes are present.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. It is mottled in shades of yellow and brown. Depth to the Cg horizon ranges from about 15 to 20 inches.

Grenada series

The Grenada series consists of moderately well drained, gently sloping to sloping soils that have a fragipan. These soils formed in thick layers of loess on uplands. Slopes range from 2 to 8 percent.

Grenada soils are near Loring and Calloway soils. Loring soils, in slightly higher upland positions, do not have a well defined A'2 horizon above the fragipan. Calloway soils, in somewhat depressional upland positions, are somewhat poorly drained and have mottles of chroma 2 or less in the upper 10 inches of the B horizon.

Typical pedon of Grenada silt loam, 2 to 5 percent slopes, 2 miles south of Atwood, 1/4 mile west of the paved road, and 100 feet north of the gravel road:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; strongly acid; abrupt smooth boundary.

B21—7 to 18 inches; yellowish brown (10YR 5/4) silt loam; common medium faint yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; friable; common fine roots; few small dark brown and black concretions; strongly acid; clear smooth boundary.

B22—18 to 23 inches; yellowish brown (10YR 5/4) silt loam; common fine and medium faint pale brown (10YR 6/3) mottles; weak fine subangular blocky structure; friable; few fine roots; common medium and large black concretions; strongly acid; clear wavy boundary.

A'2—23 to 26 inches; light brownish gray (10YR 6/2) silt loam; weak medium subangular blocky structure; friable; few fine roots; many fine voids and pores; common dark brown and black concretions; strongly acid; abrupt wavy boundary.

B'x1—26 to 48 inches; mottled dark yellowish brown (10YR 4/4), light brownish gray (10YR 6/2), and gray (10YR 5/1) silt loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; very firm, compact and brittle; prisms 3 to 7 inches across separated by tongues of gray (10YR 6/1) silt; patchy clay films on faces of peds inside prisms; strongly acid; gradual wavy boundary.

B'x2—48 to 60 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light gray (10YR 7/1) and grayish brown (10YR 5/2) mottles; moderate coarse prismatic structure parting to weak medium subangular blocky; very firm, compact and brittle; prisms 2 to 6 inches across separated by tongues of gray silt; patchy clay films on faces of peds within prisms; strongly acid.

Reaction is medium acid to very strongly acid throughout except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The B horizon has hue of 10YR, value of 4 to 6, and chroma of 4 or 6.

The A'2 horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. Texture is silt or silt loam.

The B'x horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6; or it has hue of 7.5YR, value of 4 or 5, and chroma of 4 mottled with chroma of 2 or less; or it is mottled in shades of brown, yellow, and gray.

Lexington series

The Lexington series consists of gently sloping to strongly sloping, well drained soils on the uplands. These soils formed in moderately deep loess and the underlying loamy Coastal Plain sediment. Slopes range from 2 to 12 percent.

Lexington soils are near Smithdale and Providence soils. The Smithdale soils, on somewhat steeper slopes, contain more than 15 percent sand, and formed in thick, loamy Coastal Plain sediment. Providence soils have a fragipan in the lower part of the solum and are moderately well drained.

Typical pedon of Lexington silt loam, 2 to 5 percent slopes, 2.3 miles southeast of Westport, 0.25 mile east-southeast of the blacktop road, 200 feet southeast of angle in gravel road, and 35 feet south of the gravel road:

Ap—0 to 6 inches; dark brown (7.5YR 4/4) silt loam; weak medium granular structure; very friable; many very fine roots; medium acid; clear smooth boundary.

B21t—6 to 15 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots; common patchy clay films on faces of peds; strongly acid; gradual smooth boundary.

B22t—15 to 25 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common very fine roots; common discontinuous clay films on faces of peds; strongly acid; gradual smooth boundary.

B23t—25 to 33 inches; strong brown (7.5YR 5/6) silty clay loam; common medium faint yellowish brown (10YR 5/6) skeletans; moderate medium subangular blocky structure; friable; common patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

IIB24t—33 to 46 inches; strong brown (7.5YR 5/6) loam; few medium faint yellowish brown (10YR 5/6) skeletans; moderate medium subangular blocky structure; friable; few patchy clay films on faces of peds; very strongly acid; gradual smooth boundary.

IIB31—46 to 58 inches; strong brown (7.5YR 5/6) clay loam; common coarse faint yellowish brown (10YR 5/6) skeletans; massive; friable; very strongly acid; clear smooth boundary.

IIB32—58 to 62 inches; yellowish red (5YR 4/6) sandy loam; common coarse faint yellowish brown (10YR 5/6) skeletans; massive; friable; very strongly acid.

The total thickness of the material in the A and B horizons that contains less than 15 percent sand is generally about 30 to 35 inches, but it ranges from 24 to 48 inches. Reaction is strongly acid or very strongly acid throughout except where the Ap horizon has been limed.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 6.

The Bt horizon has hue of 5YR to 7.5YR, value of 4 or 5, and chroma of 4 or 6. Texture is silt loam or silty clay loam.

The IIB2t and IIB3 horizons have hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 6 or 8. Textures are clay loam, loam, or sandy loam. Few to common yellowish or brownish skeletans are present.

In some places, laminated IIA'2 and IIB'2t horizons are present in place of the IIB3 horizons. The laminations consist of alternating thin horizontal bands of brownish loamy sand or sandy loam (IIA'2) and yellowish red loam or sandy clay loam (IIB'2t).

Loring series

The Loring series consists of gently sloping to strongly sloping, moderately well drained soils with a fragipan. These soils formed in thick loess on uplands. Slopes range from 2 to 12 percent.

Loring soils are near Grenada and Collins soils. Grenada soils, on somewhat lower, slightly concave upland slopes, have a distinct gray silt loam A'2 horizon, which tongues or interfingers into the underlying fragipan. Collins soils, on flood plains, have neither an argillic horizon nor a fragipan.

Typical pedon of Loring silt loam, 2 to 5 percent slopes, 3/4 mile northeast of Christmasville, 3,000 feet north of Route 8095 along a gravel road, 120 feet west of the road, and 480 feet south of a property line:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak medium granular structure; very friable, slightly sticky and slightly plastic; common fine roots; slightly acid; abrupt smooth boundary.

B21t—6 to 20 inches; dark brown (7.5YR 4/4) silt loam; few medium faint yellowish brown (10YR 5/4) skeletans; moderate medium subangular blocky structure; friable, slightly sticky and slightly plastic; common thin patchy clay films on faces of peds; few fine pores; common very fine roots; few coarse black stains on vertical faces; very strongly acid; gradual wavy boundary.

B22t—20 to 26 inches; dark brown (7.5YR 4/4) silt loam; many coarse faint yellowish brown (10YR 5/4) skeletans; weak medium subangular blocky structure; friable, slightly sticky and slightly plastic; common fine and few medium pores; very strongly acid; clear wavy boundary.

Bx1—26 to 38 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) and few medium faint yellowish brown (10YR 5/4) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm, brittle, slightly sticky and slightly plastic; common very fine vesicular pores; common fine black stains; few vertical 1-inch thick seams of gray (10YR 6/1) eluviated silt; very strongly acid; gradual irregular boundary.

Bx2—38 to 62 inches; strong brown (7.5YR 5/6) silt loam; common medium distinct light brownish gray (10YR 6/2) and few medium faint yellowish brown (10YR 5/4) mottles; weak very coarse prismatic structure parting to weak coarse subangular blocky; very firm, brittle, slightly sticky and slightly plastic; few fine black stains; few vertical 1-inch thick seams of gray (10YR 6/1) eluviated silt; very strongly acid.

Depth to the fragipan ranges from 20 to 35 inches. Reaction ranges from medium acid to very strongly acid except where the surface layer has been limed.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4; or it has hue of 7.5YR, value of 5, and chroma of 4 or 6.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. Texture is silt loam or silty clay loam.

The Bx horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6; it has mottles in shades of yellow, brown, and gray or is evenly mottled in gray, brown, and yellow.

Providence series

The Providence series consists of moderately well drained, gently sloping to strongly sloping soils that have a fragipan. These soils are in slightly concave upland positions. They formed in loess about 2 or 3 feet thick and in the underlying loamy Coastal Plain sediment. Slopes are 2 to 12 percent.

Providence soils are near Lexington and Smithdale soils. The Lexington soils, on somewhat higher, convex uplands, are well drained but do not have a fragipan. Smithdale soils, on moderately steep side slopes, are also well drained, do not have a fragipan, and have a fine-loamy control section.

Typical pedon of Providence silt loam, 2 to 5 percent slopes, 0.85 mile east of Little Beaver Creek and 100 feet north of gravel road:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; medium acid; abrupt smooth boundary.

B21t—6 to 14 inches; strong brown (7.5YR 5/6) silty clay loam; continuous thin reddish brown (5YR 5/4) clay films on faces of peds; moderate medium subangular blocky structure; friable; many fine roots; strongly acid; clear smooth boundary.

B22t—14 to 22 inches; strong brown (7.5YR 5/6) silt loam; common fine and medium faint yellowish brown (10YR 5/6) and reddish brown (5YR 5/4) mottles; moderate fine and medium subangular blocky structure; friable; patchy clay films on faces of peds; common fine roots; strongly acid; clear wavy boundary.

Bx—22 to 34 inches; mottled reddish brown (5YR 4/4), brown (10YR 5/3) and light gray (10YR 7/2) silt loam; weak coarse prismatic structure; parting to moderate medium subangular blocky; firm, compact and brittle; prisms coated with gray silt; patchy clay films on faces of peds inside prisms; few black concretions; strongly acid; clear wavy boundary.

IIB23t—34 to 45 inches; mottled yellowish red (5YR 4/6), strong brown (7.5YR 5/6), and light gray (10YR 7/2) loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact; prisms separated by gray silt loam; thick patchy clay films on faces of peds inside prisms; strongly acid; clear wavy boundary.

IIB24t—45 to 60 inches; mottled yellowish red (5YR 4/6), yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and light gray (10YR 7/2) loam; strong medium subangular blocky structure; firm; continuous clay films on faces of some peds and medium pores filled with gray clay; strongly acid.

The depth to the fragipan ranges from 18 to 38 inches. The soil is strongly acid or very strongly acid throughout except where the surface has been limed.

The Ap horizon has hue of 10YR, value of 3 to 6, and chroma of 2 to 6.

The B2t horizon has hue of 10YR to 5YR, value of 4 or 5, and chroma of 4 to 8. Texture is silt loam or silty clay loam.

The Bx and IIBt horizons are mottled in shades of red, brown, gray, and yellow. The Bx horizon is silty clay loam or silt loam, and the IIBt horizon is clay loam, sandy clay loam, loam, or sandy loam.

Smithdale series

The Smithdale series consists of well drained soils that formed in thick beds of Coastal Plain sediment. These strongly sloping to steep soils are on upland side slopes and ridges. Slopes range from 8 to 35 percent.

Smithdale soils are near Lexington, Providence, and Collins soils. Lexington and Providence soils, on higher ridgetops, have a fine-silty control section and base saturation of 35 percent or more. In addition, the Providence soils are moderately well drained and have a fragipan. Collins soils, on narrow flood plains, are moderately well drained but do not have an argillic horizon.

Typical pedon of Smithdale fine sandy loam, 12 to 20 percent slopes, in hardwood timber 4 miles southeast of Buena Vista, 300 feet west of Natchez Trace State Park boundary, and 200 feet south of gravel road:

O2—1 inch to 0 inches; partly decomposed forest litter.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear smooth boundary.

A2—3 to 11 inches; yellowish brown (10YR 5/4) fine sandy loam; few fine faint yellowish brown mottles; weak fine granular structure; very friable; common fine and medium roots; very strongly acid; clear smooth boundary.

B21t—11 to 29 inches; yellowish red (5YR 4/6) sandy clay loam; moderate fine and medium subangular blocky structure; friable; continuous clay films on faces of peds; common fine and medium roots; few small black stains; strongly acid; clear wavy boundary.

B22t—29 to 43 inches; yellowish red (5YR 5/6) sandy clay loam; few fine and medium faint red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; few fine and medium roots; strongly acid; clear wavy boundary.

B23t—43 to 70 inches; red (2.5YR 4/6) sandy loam; few fine and medium faint yellowish red (5YR 4/6) mottles; few 1/2 to 2 inch pockets of strong brown (7.5YR 5/6) loamy sand; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; strongly acid.

Reaction is strongly acid or very strongly acid throughout except where the surface layer has been limed. Up to 10 percent, by volume, of ironstone fragments are present in some places.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Texture of the upper 20 inches of the Bt horizon is sandy clay loam, clay loam, or loam. Texture of the lower Bt horizon is sandy loam or loam. Few to common pockets of uncoated sand grains are present.

Sweatman series

The Sweatman series consists of well drained, strongly sloping to steep soils on uplands. The soils formed in thick stratified clayey and loamy Coastal Plain sediment. Slopes range from 8 to 35 percent.

Sweatman soils are geographically associated with Grenada and Smithdale soils. Grenada soils have a silty upper subsoil underlain by a fragipan and are on more gently sloping, slightly concave portions of the adjacent uplands. Smithdale soils have a fine-loamy control section and a thicker solum and are on side slopes of higher ridges.

Typical pedon of Sweatman loam, 12 to 20 percent slopes, 3 miles northeast of Huntingdon, 1/4 mile north of TVA power substation, and 300 feet east of blacktop road, at south edge of powerline right-of-way:

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam; weak fine granular structure; friable; many fine roots; few flat fragments of ironstone occupy less than 5 percent of surface; slightly acid; clear smooth boundary.

A2—2 to 8 inches; brown (10YR 5/3) loam; weak medium granular structure; friable; many fine roots; very strongly acid; clear smooth boundary.

B21t—8 to 18 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm, plastic and slightly sticky; few fine roots; common discontinuous clay films on faces of peds; few small soft fragments of sandstone containing clean, brilliant clear sand grains; very strongly acid; clear smooth boundary.

B22t—18 to 30 inches; yellowish red (5YR 5/6) clay; many fine distinct strong brown (7.5YR 5/6) and pale brown (10YR 6/3) mottles; weak fine angular and subangular blocky structure; firm, plastic and sticky; few fine roots; few soft gray fragments of shale; very strongly acid; gradual smooth boundary.

B3—30 to 36 inches; strong brown (7.5YR 5/6) silty clay loam; many fine prominent pale brown (10YR 6/3) and many fine distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm, slightly plastic and slightly sticky; few fine roots; few thin patchy clay films on faces of peds; about 20 percent by volume small, soft gray fragments of shale; very strongly acid; gradual smooth boundary.

C—36 to 60 inches; light gray (10YR 6/1) soft level-bedded clayey shale; common very thin strong brown (7.5YR 5/6) streaks along weathered planes; few thin bands of yellowish brown (10YR 5/4) sandy clay loam; few fine roots in vertical cracks and along horizontal bedding planes; very strongly acid.

Solum thickness ranges from 20 to 40 inches. Reaction is strongly acid or very strongly acid throughout the profile except where the surface layer has been limed.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 or 3. Texture is loam, silt loam, or fine sandy loam.

The Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6. Texture is silty clay or clay.

The B3 horizon has hue of 5YR, value of 4 or 5, and chroma of 6 or hue of 7.5YR, value of 5, and chroma of 6 or 8. Texture is silty clay loam, silty clay, or clay. Many to common mottles in shades of gray, red, or brown are present. Fragments of ironstone and soft fragments of shale occupy up to 25 percent of the volume.

The C horizon is partially weathered, fractured acid clayey shale that has some thin sandy strata that have small flakes of mica.

Waverly series

The Waverly series consists of poorly drained, level soils on the low flood plains. These soils formed in thick alluvial deposits primarily from loess. Slopes are predominantly less than 1 percent but range from 0 to 2 percent.

Waverly soils are on the same landscape as Falaya and Collins soils. Falaya soils, in slightly higher bottom land positions, are somewhat poorly drained and have higher chroma in the upper 20 inches of the profile. Collins soils are moderately well drained and have high chroma within the control section.

Typical pedon of Waverly silt loam, occasionally flooded, 3 miles east of McLemoresville, 0.1 mile west of Reedy Creek, and 0.1 mile south of U.S. Highway 70A:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; common medium distinct pale brown (10YR 6/3) mottles; weak medium and fine granular structure; very friable; common fine roots; few small concretions; strongly acid; abrupt smooth boundary.

B21g—7 to 24 inches; gray (10YR 5/1) silt loam; common fine distinct dark grayish brown (10YR 4/2), yellowish brown (10YR 5/6), and brown (10YR 4/3) mottles; weak medium subangular blocky structure; very friable; common fine pores; common small concretions; strongly acid; clear smooth boundary.

B22g—24 to 40 inches; gray (10YR 5/1) silt loam; common fine distinct yellowish brown (10YR 5/6) and brown (10YR 4/3) mottles; weak medium subangular blocky structure; very friable; few 1/2-inch thick horizontal strata of very dark grayish brown (10YR 3/2) silt loam; strongly acid; clear smooth boundary.

A1b—40 to 42 inches; dark gray (10YR 4/1) silt loam; massive; friable; strongly acid; abrupt smooth boundary.

Cg—42 to 60 inches; gray (10YR 6/1) silt loam; few fine distinct yellowish brown mottled; massive; friable; strongly acid.

Reaction is strongly acid or very strongly acid. Black and brown concretions range from few to many.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. Mottles are present in most pedons.

The B horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. Mottles in shades of yellow and brown are few to common.

Buried A and C horizons are similar to the B horizon.

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Glossary

ABC soil. A soil having an A, a B, and a C horizon.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bottom land. The normal flood plain of a stream, subject to flooding.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Dendritic drainage pattern. Irregular branching (treelike) in all directions with tributaries joining the main stream at all angles.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the

building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion. *Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow

over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Side slope. The more sloping part of a landscape below the ridgetop. As used in this survey, it includes nose slope, head slope, and side slope.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded 1962-79 at Huntingdon, Tenn.]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[1]	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	44.7	23.4	34.1	73	-4	27	4.23	1.91	6.22	8	3.6
February---	48.7	25.6	37.2	76	4	17	3.93	2.27	5.40	7	1.5
March------	60.6	36.8	48.7	84	17	148	5.60	3.13	7.78	9	1.0
April------	72.5	47.5	60.0	88	29	300	5.17	2.58	7.41	8	.0
May--------	79.1	54.5	66.8	92	34	521	5.53	3.36	7.47	8	.0
June-------	86.5	62.7	74.6	98	47	738	3.74	1.81	5.41	6	.0
July-------	89.5	66.5	78.0	99	52	868	4.76	2.41	6.80	6	.0
August-----	88.4	64.2	76.3	98	50	815	4.13	1.98	5.98	6	.0
September--	82.4	58.0	70.2	95	39	606	4.78	2.23	6.97	6	.0
October----	73.3	44.4	58.9	89	27	294	3.14	1.32	4.73	4	.0
November---	60.3	36.3	48.3	82	15	80	4.50	2.51	6.25	7	.1
December---	50.0	28.4	39.2	73	5	23	5.12	2.21	7.60	7	1.1
Yearly:											
Average--	69.7	45.7	57.7	---	---	---	---	---	---	---	---
Extreme--	---	---	---	99	-5	---	---	---	---	---	---
Total----	---	---	---	---	---	4,437	54.63	44.62	65.01	82	7.3

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded 1962-79 at Huntingdon, Tenn.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 1	April 7	April 18
2 years in 10 later than--	March 25	April 3	April 14
5 years in 10 later than--	March 13	March 28	April 5
First freezing temperature in fall:			
1 year in 10 earlier than--	October 29	October 23	October 6
2 years in 10 earlier than--	November 4	October 28	October 11
5 years in 10 earlier than--	November 15	November 6	October 20

TABLE 3.--GROWING SEASON

[Recorded 1962-79 at Huntingdon, Tenn.]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	219	204	181
8 years in 10	228	211	187
5 years in 10	245	224	198
2 years in 10	264	239	209
1 year in 10	277	249	217

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ca	Calloway silt loam	5,370	1.4
Co	Collins silt loam, occasionally flooded	26,970	7.1
Fa	Falaya silt loam, occasionally flooded	42,310	11.1
GrB	Grenada silt loam, 2 to 5 percent slopes	12,850	3.4
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	7,100	1.9
LeB	Lexington silt loam, 2 to 5 percent slopes	39,060	10.2
LeC2	Lexington silt loam, 5 to 8 percent slopes, eroded	34,550	9.1
LeD2	Lexington silt loam, 8 to 12 percent slopes, eroded	15,250	4.0
LoB	Loring silt loam, 2 to 5 percent slopes	2,540	0.7
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	1,610	0.4
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	2,220	0.6
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	2,170	0.6
PrB	Providence silt loam, 2 to 5 percent slopes	14,580	3.8
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded	16,760	4.4
PrD2	Providence silt loam, 8 to 12 percent slopes, eroded	9,700	2.5
SmD2	Smithdale fine sandy loam, 8 to 12 percent slopes, eroded	30,250	7.9
SmE	Smithdale fine sandy loam, 12 to 20 percent slopes	20,560	5.4
SmE3	Smithdale fine sandy loam, 12 to 20 percent slopes, severely eroded	12,270	3.2
SwD	Sweatman loam, 8 to 12 percent slopes	6,520	1.7
SwE	Sweatman loam, 12 to 20 percent slopes	5,080	1.3
SwE3	Sweatman loam, 12 to 20 percent slopes, severely eroded	1,690	0.4
Up	Udorthents-Pits complex	380	0.1
Us	Udorthents-Smithdale complex, gullied	16,000	4.2
Uw	Udorthents-Sweatman complex, gullied	1,080	0.3
Wf	Waverly silt loam, frequently flooded	4,120	1.1
Wo	Waverly silt loam, occasionally flooded	46,470	12.2
Wp	Waverly silt loam, ponded	3,040	0.8
	Water	900	0.2
	Total	381,400	100.0

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Corn	Cotton lint	Soybeans	Tall fescue	Improved bermuda-grass	Wheat	Grass-legume hay
	Bu	Lb	Bu	AUM*	AUM*	Bu	Ton
Ca---------------------- Calloway	85	650	35	8.0	9.0	---	---
Co---------------------- Collins	110	800	40	10	12	40	---
Fa---------------------- Falaya	100	750	40	8.0	---	36	---
GrB--------------------- Grenada	80	600	35	8.0	9.5	---	4.0
GrC3-------------------- Grenada	---	---	---	7.0	7.0	---	3.5
LeB--------------------- Lexington	90	700	35	---	---	45	---
LeC2-------------------- Lexington	60	400	20	---	---	30	---
LeD2-------------------- Lexington	---	---	---	---	---	---	---
LoB--------------------- Loring	90	700	30	---	---	40	4.0
LoB3-------------------- Loring	70	650	25	---	---	35	3.5
LoC3-------------------- Loring	65	600	20	---	---	30	3.5
LoD3-------------------- Loring	55	450	15	---	---	25	2.5
PrB--------------------- Providence	80	700	35	8.5	9.5	---	---
PrC2-------------------- Providence	55	500	25	---	8.5	---	---
PrD2-------------------- Providence	---	---	---	---	8.5	---	---
SmD2-------------------- Smithdale	---	---	---	---	8.0	---	---
SmE--------------------- Smithdale	---	---	---	---	9.0	---	---
SmE3-------------------- Smithdale	---	---	---	---	8.0	---	---
SwD--------------------- Sweatman	---	---	---	---	---	---	---
SwE--------------------- Sweatman	---	---	---	---	---	---	---
SwE3-------------------- Sweatman	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Cotton lint	Soybeans	Tall fescue	Improved bermuda-grass	Wheat	Grass-legume hay
	Bu	Lb	Bu	AUM*	AUM*	Bu	Ton
Up------------------------- Udorthents-Pits	---	---	---	---	---	---	---
Us------------------------- Udorthents-Smithdale	---	---	---	---	---	---	---
Uw------------------------- Udorthents-Sweatman	---	---	---	---	---	---	---
Wf------------------------- Waverly	---	---	---	7.0	7.0	---	---
Wo------------------------- Waverly	70	550	30	9.0	8.0	---	---
Wp------------------------- Waverly	---	---	25	6.0	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Ca: Calloway	2w	Slight	Moderate	Slight	Moderate	Cherrybark oak	90	Cherrybark oak, Shumard oak, sweetgum, water oak, yellow-poplar.
						Loblolly pine	90	
						Shortleaf pine	80	
						Sweetgum	90	
						Water oak	90	
Co: Collins	1o	Slight	Slight	Slight	Severe	Green ash	95	Green ash, eastern cottonwood, cherrybark oak.
						Eastern cottonwood	115	
						Cherrybark oak	110	
Fa: Falaya	1w	Slight	Moderate	Slight	Slight	Green ash	92	Green ash, eastern cottonwood, cherrybark oak, Nuttall oak, sweetgum, yellow-poplar.
						Eastern cottonwood	100	
						Cherrybark oak	102	
						Nuttall oak	109	
						Water oak	102	
						Loblolly pine	104	
						Slash pine	104	
GrB, GrC3: Grenada	3o	Slight	Slight	Slight	Slight	Cherrybark oak	85	Cherrybark oak, Shumard oak, water oak, loblolly pine, white oak, shortleaf pine, slash pine, sweetgum.
						Southern red oak	80	
						Loblolly pine	85	
						Shortleaf pine	75	
						Sweetgum	80	
LeB, LeC2, LeD2: Lexington	3o	Slight	Slight	Slight	Moderate	Cherrybark oak	80	Cherrybark oak, Shumard oak, loblolly pine, yellow-poplar, sweetgum.
						Southern red oak	70	
						Loblolly pine	80	
						Shortleaf pine	70	
						Sweetgum	89	
						Shagbark hickory	---	
						Yellow-poplar	90	
						Black walnut	---	
						Black cherry	---	
LoB, LoB3, LoC3, LoD3: Loring	3o	Slight	Slight	Slight	Severe	Cherrybark oak	86	Loblolly pine, yellow-poplar, southern red oak.
						Sweetgum	90	
						Southern red oak	74	
						Loblolly pine	85	
						Water oak	82	
PrB, PrC2, PrD2: Providence	3o	Slight	Slight	Slight	Slight	Loblolly pine	84	Loblolly pine, Shumard oak, sweetgum, yellow-poplar.
						Shortleaf pine	64	
						Sweetgum	90	
SmD2, SmE, SmE3: Smithdale	3o	Slight	Slight	Slight	Moderate	Loblolly pine	80	Loblolly pine.
						Shortleaf pine	69	
SwD, SwE: Sweatman	3c	Slight	Moderate	Slight	Slight	Loblolly pine	83	Loblolly pine, shortleaf pine.
						Shortleaf pine	73	
SwE3: Sweatman	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine	74	Loblolly pine.
Us:* Udorthents.								
Smithdale	3o	Slight	Slight	Slight	Moderate	Loblolly pine	80	Loblolly pine.
						Shortleaf pine	69	

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	
Uw:* Udorthents.								
Sweatman	4c	Moderate	Moderate	Moderate	Slight	Loblolly pine	74	Loblolly pine.
Wf, Wo: Waverly	2w	Slight	Severe	Severe	Moderate	Eastern cottonwood	105	Eastern cottonwood, cherrybark oak, water oak, willow oak, sweetgum, American sycamore, water tupelo, loblolly pine.
						Cherrybark oak	100	
						Nuttall oak	100	
						Water oak	95	
						Willow oak	95	
						Loblolly pine	95	
						Sweetgum	100	
Wp: Waverly	2w	Slight	Severe	Severe	Moderate	Eastern cottonwood	105	Eastern cottonwood, water oak, willow oak, sweetgum, American sycamore, water tupelo.
						Water oak	95	
						Willow oak	95	
						Sweetgum	100	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ca: Calloway	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Co: Collins	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
Fa: Falaya	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, flooding.
GrB: Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
GrC3: Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
LeB: Lexington	Slight	Slight	Moderate: slope.	Slight	Slight.
LeC2: Lexington	Slight	Slight	Severe: slope.	Slight	Slight.
LeD2: Lexington	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
LoB, LoB3: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Slight.
LoC3: Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.
LoD3: Loring	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
PrB: Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight	Moderate: wetness.
PrC2: Providence	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Moderate: wetness.
PrD2: Providence	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: wetness, slope.
SmD2: Smithdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
SmE, SmE3: Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SwD------------------- Sweatman	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
SwE, SwE3------------- Sweatman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Up:* Udorthents.					
Pits.					
Us:* Udorthents.					
Smithdale------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Uw:* Udorthents.					
Sweatman-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Wf-------------------- Waverly	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Wo-------------------- Waverly	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wp-------------------- Waverly	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ca: Calloway	Fair	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.
Co: Collins	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Fa: Falaya	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
GrB: Grenada	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
GrC3: Grenada	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LeB: Lexington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LeC2, LeD2: Lexington	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
LoB, LoB3: Loring	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC3, LoD3: Loring	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
PrB: Providence	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
PrC2, PrD2: Providence	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SmD2: Smithdale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SmE, SmE3: Smithdale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SwD: Sweatman	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
SwE, SwE3: Sweatman	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Up:* Udorthents.										
Pits.										
Us:* Udorthents.										
Smithdale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Uw:* Udorthents.										
Sweatman	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Wf----------------- Waverly	Poor	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair.
Wo----------------- Waverly	Poor	Fair	Good	Fair	---	Good	Fair	Fair	Fair	Fair.
Wp----------------- Waverly	Poor	Fair	Fair	Fair	---	Good	Fair	Fair	Fair	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Ca Calloway	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.
Co Collins	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.
Fa Falaya	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding.
GrB Grenada	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.
GrC3 Grenada	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.
LeB Lexington	Slight	Slight	Slight	Slight	Severe: low strength.
LeC2 Lexington	Slight	Slight	Slight	Moderate: slope.	Severe: low strength.
LeD2 Lexington	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.
LoB, LoB3 Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.
LoC3 Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.
LoD3 Loring	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
PrB Providence	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.
PrC2 Providence	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.
PrD2 Providence	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.
SmD2 Smithdale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.
SmE, SmE3 Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
SwD Sweatman	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.
SwE, SwE3 Sweatman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Up:*					
Udorthents.					
Pits.					
Us:*					
Udorthents.					
Smithdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Uw:*					
Udorthents.					
Sweatman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Wf, Wo Waverly	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.
Wp Waverly	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ca: Calloway	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Co: Collins	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Fa: Falaya	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
GrB, GrC3: Grenada	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
LeB, LeC2: Lexington	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too clayey.
LeD2: Lexington	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
LoB, LoB3, LoC3: Loring	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
LoD3: Loring	Severe: wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, wetness.
PrB, PrC2: Providence	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
PrD2: Providence	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
SmD2: Smithdale	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: too clayey, slope.
SmE, SmE3: Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
SwD: Sweatman	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
SwE, SwE3: Sweatman	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Up:* Udorthents.					
Pits.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Us:* Udorthents.					
Smithdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
Uw:* Udorthents.					
Sweatman	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Wf, Wo Waverly	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Wp Waverly	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," and "improbable." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Roadfill	Sand	Topsoil
Ca: Calloway	Poor: low strength.	Improbable: excess fines.	Good.
Co: Collins	Fair: wetness, low strength.	Improbable: excess fines.	Good.
Fa: Falaya	Fair: thin layer, wetness.	Improbable: excess fines.	Good.
GrB, GrC3: Grenada	Poor: low strength.	Improbable: excess fines.	Good.
LeB, LeC2: Lexington	Good	Improbable: excess fines.	Good.
LeD2: Lexington	Good	Improbable: excess fines.	Fair: slope.
LoB, LoB3, LoC3: Loring	Poor: low strength.	Improbable: excess fines.	Good.
LoD3: Loring	Poor: low strength.	Improbable: excess fines.	Fair: slope.
PrB, PrC2: Providence	Fair: wetness.	Improbable: excess fines.	Good.
PrD2: Providence	Fair: wetness.	Improbable: excess fines.	Fair: slope.
SmD2: Smithdale	Good	Improbable: excess fines.	Fair: small stones, slope.
SmE, SmE3: Smithdale	Fair: slope.	Improbable: excess fines.	Poor: slope.
SwD: Sweatman	Poor: low strength.	Improbable: excess fines.	Poor: thin layer.
SwE, SwE3: Sweatman	Poor: low strength.	Improbable: excess fines.	Poor: thin layer, slope.
Up:* Udorthents.			
Pits.			
Us:* Udorthents.			
Smithdale	Fair: slope.	Improbable: excess fines.	Poor: slope.
Uw:* Udorthents.			

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Topsoil
Uw:*			
Sweatman	Poor: low strength.	Improbable: excess fines.	Poor: thin layer, slope.
Wf, Wo, Wp Waverly	Poor: wetness.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Ca: Calloway	Moderate: seepage.	Severe: thin layer.	Severe: no water.	Percs slowly	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
Co: Collins	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Flooding	Erodes easily, wetness.	Erodes easily.
Fa: Falaya	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Flooding	Erodes easily, wetness.	Wetness, erodes easily.
GrB: Grenada	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.
GrC3: Grenada	Moderate: seepage.	Severe: piping.	Severe: no water.	Percs slowly, slope.	Erodes easily, wetness, percs slowly.	Erodes easily, rooting depth, percs slowly.
LeB, LeC2: Lexington	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
LeD2: Lexington	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
LoB, LoB3, LoC3: Loring	Moderate: seepage.	Moderate: piping.	Severe: no water.	Slope	Erodes easily, wetness.	Erodes easily, rooting depth.
LoD3: Loring	Moderate: seepage.	Moderate: piping.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
PrB, PrC2: Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Erodes easily, wetness.	Erodes easily, rooting depth.
PrD2: Providence	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Severe: no water.	Slope	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
SmD2, SmE, SmE3: Smithdale	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
SwD, SwE, SwE3: Sweatman	Slight	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.
Up:* Udorthents.						
Pits.						
Us:* Udorthents.						
Smithdale	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope.
Uw:* Udorthents.						
Sweatman	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Terraces and diversions	Grassed waterways
Wf, Wo------------ Waverly	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Flooding-------	Erodes easily, wetness.	Wetness, erodes easily.
Wp---------------- Waverly	Moderate: seepage.	Severe: piping, ponding.	Moderate: slow refill.	Ponding--------	Erodes easily, ponding.	Wetness, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Ca----------------- Calloway	0-26	Silt loam--------	CL-ML, CL	A-4, A-6	100	100	100	90-100	25-35	5-15
	26-40	Silt loam, silty clay loam.	CL	A-6	100	100	100	90-95	30-40	12-20
	40-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	100	100	100	90-100	25-35	5-15
Co----------------- Collins	0-8	Silt loam--------	ML, CL, CL-ML	A-4	100	100	85-100	70-90	<30	NP-8
	8-60	Silt loam, silt	ML, CL-ML	A-4	100	100	100	90-100	<35	NP-10
Fa----------------- Falaya	0-60	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	95-100	<30	NP-10
GrB---------------- Grenada	0-7	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	90-100	<30	NP-6
	7-23	Silt loam, silty clay loam.	CL	A-6, A-4	100	100	95-100	90-100	27-40	8-19
	23-26	Silt loam--------	CL-ML, CL	A-4	100	100	95-100	90-100	20-30	5-10
	26-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
GrC3--------------- Grenada	0-6	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	90-100	<30	NP-6
	6-14	Silt loam, silty clay loam.	CL	A-6, A-4	100	100	95-100	90-100	27-40	8-19
	14-17	Silt loam--------	CL-ML, CL	A-4	100	100	95-100	90-100	20-30	5-10
	17-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
LeB---------------- Lexington	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	100	95-100	90-100	70-95	25-42	5-16
	6-33	Silty clay loam, silt loam.	CL	A-6, A-7	100	95-100	90-100	75-95	27-45	11-25
	33-62	Loam, sandy loam, clay loam.	SC, SM-SC	A-2, A-4, A-6	100	95-100	50-70	20-40	22-35	5-15
LeC2--------------- Lexington	0-6	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	100	95-100	90-100	70-95	25-42	5-16
	6-25	Silty clay loam, silt loam.	CL	A-6, A-7	100	95-100	90-100	75-95	27-45	11-25
	25-62	Sandy loam, clay loam.	SC, SM-SC	A-2, A-4, A-6	100	95-100	50-70	20-40	22-35	5-15
LeD2--------------- Lexington	0-4	Silt loam--------	ML, CL, CL-ML	A-4, A-6, A-7	100	95-100	90-100	70-95	25-42	5-16
	4-24	Silty clay loam, silt loam.	CL	A-6, A-7	100	95-100	90-100	75-95	27-45	11-25
	24-62	Sandy loam, clay loam.	SC, SM-SC	A-2, A-4, A-6	100	95-100	50-70	20-40	22-35	5-15
LoB---------------- Loring	0-6	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	6-26	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	8-20
	26-62	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	8-22
LoB3, LoC3-------- Loring	0-4	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	4-20	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	8-20
	20-60	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	8-22

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
LoD3-------------- Loring	0-4	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	4-20	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	8-20
	20-60	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	8-22
PrB--------------- Providence	0-6	Silt loam--------	ML, CL, CL-ML	A-4	100	100	100	85-100	<30	NP-10
	6-22	Silty clay loam, silt loam.	CL	A-7, A-6	100	100	95-100	85-100	30-45	11-20
	22-34	Silt loam, silty clay loam.	CL	A-6	100	100	90-100	70-90	25-40	11-20
	34-60	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	100	95-100	70-95	40-80	20-35	8-18
PrC2, PrD2------- Providence	0-6	Silt loam--------	ML, CL, CL-ML	A-4	100	100	100	85-100	<30	NP-10
	6-16	Silty clay loam, silt loam.	CL	A-7, A-6	100	100	95-100	85-100	30-45	11-20
	16-34	Silt loam, silty clay loam.	CL	A-6	100	100	90-100	70-90	25-40	11-20
	34-60	Loam, clay loam, sandy clay loam.	CL, SC	A-6, A-4	100	95-100	70-95	40-80	20-35	8-18
SmD2-------------- Smithdale	0-5	Fine sandy loam	SM, SM-SC	A-4	100	85-100	60-80	36-49	<20	NP-5
	5-38	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-95	45-75	23-38	7-15
	38-60	Loam, sandy loam	SM, ML, CL, SC	A-4	100	85-100	65-80	36-70	<30	NP-10
SmE--------------- Smithdale	0-11	Fine sandy loam	SM, SM-SC	A-4	100	85-100	60-80	36-49	<20	NP-5
	11-43	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-95	45-75	23-38	7-15
	43-70	Loam, sandy loam	SM, ML, CL, SC	A-4	100	85-100	65-80	36-70	<30	NP-10
SmE3-------------- Smithdale	0-5	Fine sandy loam	SM, SM-SC	A-4	100	85-100	60-80	36-49	<20	NP-5
	5-38	Clay loam, sandy clay loam, loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-95	45-75	23-38	7-15
	38-60	Loam, sandy loam	SM, ML, CL, SC	A-4	100	85-100	65-80	36-70	<30	NP-10
SwD--------------- Sweatman	0-4	Loam-------------	CL-ML, CL, ML	A-4	100	100	90-100	55-90	<35	NP-10
	4-22	Clay, silty clay, silty clay loam.	MH	A-7	95-100	95-100	95-100	90-95	60-80	25-40
	22-32	Clay, silty clay loam, silty clay.	MH, CL	A-6, A-7	95-100	80-100	80-100	70-85	30-70	12-30
	32-60	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	95-100	75-100	60-95	55-95	41-65	12-30
SwE--------------- Sweatman	0-8	Loam-------------	CL-ML, CL, ML	A-4	100	100	90-100	55-90	<35	NP-10
	8-30	Clay, silty clay, silty clay loam.	MH	A-7	95-100	95-100	95-100	90-95	60-80	25-40
	30-36	Clay, silty clay loam, silty clay.	MH, CL	A-6, A-7	95-100	80-100	80-100	70-85	30-70	12-30
	36-60	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	95-100	75-100	60-95	55-95	41-65	12-30

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
SwE3: Sweatman	0-4	Loam	CL-ML, CL, ML	A-4	100	100	90-100	55-90	<35	NP-10
	4-22	Clay, silty clay, silty clay loam.	MH	A-7	95-100	95-100	95-100	90-95	60-80	25-40
	22-32	Clay, silty clay loam, silty clay.	MH, CL	A-6, A-7	95-100	80-100	80-100	70-85	30-70	12-30
	32-60	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	95-100	75-100	60-95	55-95	41-65	12-30
Up:* Udorthents.										
Pits.										
Us:* Udorthents.										
Smithdale	0-5	Fine sandy loam	SM, SM-SC	A-4	100	85-100	60-80	36-49	<20	NP-5
	5-60	Clay loam, sandy clay loam, sandy loam.	SM-SC, SC, CL, CL-ML	A-6, A-4	100	85-100	80-95	45-75	23-38	7-15
Uw:* Udorthents.										
Sweatman	0-5	Loam	CL-ML, CL, ML	A-4	100	100	90-100	55-90	<35	NP-10
	5-30	Clay, silty clay, silty clay loam.	MH	A-7	95-100	95-100	95-100	90-95	60-80	25-40
	30-60	Stratified weathered bedrock to fine sandy loam.	ML, MH	A-7	95-100	75-100	60-95	55-95	41-65	12-30
Wf: Waverly	0-60	Silt loam	ML, CL, CL-ML	A-4	100	100	90-100	65-95	<25	NP-9
Wo: Waverly	0-7	Silt loam	ML, CL, CL-ML	A-4	100	100	90-100	65-95	<25	NP-9
	7-60	Silt, silt loam	ML, CL, CL-ML	A-4	100	100	95-100	85-100	20-30	3-10
Wp: Waverly	0-8	Silt loam	ML, CL, CL-ML	A-4	100	100	90-100	65-95	<25	NP-9
	8-60	Silt, silt loam	ML, CL, CL-ML	A-4	100	100	95-100	85-100	20-30	3-10

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[Entries under "Erosion factors--T" apply to the entire profile. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
Ca----------------Calloway	0-26	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.49	3
	26-40	0.06-0.2	0.09-0.12	4.5-6.0	Moderate--------	0.43	
	40-60	0.06-0.2	0.09-0.12	5.1-7.8	Low------------	0.43	
Co----------------Collins	0-8	0.6-2.0	0.16-0.24	4.5-5.5	Low------------	0.43	5
	8-60	0.6-2.0	0.20-0.24	4.5-5.5	Low------------	0.43	
Fa----------------Falaya	0-60	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	5
GrB---------------Grenada	0-7	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	3
	7-23	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	
	23-26	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	
	26-60	0.06-0.2	0.10-0.12	4.5-6.0	Low------------	0.37	
GrC3--------------Grenada	0-6	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	3
	6-14	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	
	14-17	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	
	17-60	0.06-0.2	0.10-0.12	4.5-6.0	Low------------	0.37	
LeB---------------Lexington	0-6	0.6-2.0	0.17-0.22	4.5-6.0	Low------------	0.43	3
	6-33	0.6-2.0	0.16-0.21	4.5-6.0	Low------------	0.43	
	33-62	2.0-6.0	0.05-0.10	4.5-6.0	Low------------	0.24	
LeC2--------------Lexington	0-6	0.6-2.0	0.17-0.22	4.5-6.0	Low------------	0.43	3
	6-25	0.6-2.0	0.16-0.21	4.5-6.0	Low------------	0.43	
	25-62	2.0-6.0	0.05-0.10	4.5-6.0	Low------------	0.24	
LeD2--------------Lexington	0-4	0.6-2.0	0.17-0.22	4.5-6.0	Low------------	0.43	3
	4-24	0.6-2.0	0.16-0.21	4.5-6.0	Low------------	0.43	
	24-62	2.0-6.0	0.05-0.10	4.5-6.0	Low------------	0.24	
LoB---------------Loring	0-6	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	3
	6-26	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	
	26-62	0.2-0.6	0.06-0.13	4.5-6.0	Low------------	0.43	
LoB3, LoC3--------Loring	0-4	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	3
	4-20	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	
	20-60	0.2-0.6	0.06-0.13	4.5-6.0	Low------------	0.43	
LoD3--------------Loring	0-4	0.6-2.0	0.20-0.23	4.5-6.0	Low------------	0.43	3
	4-20	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	
	20-60	0.2-0.6	0.06-0.13	4.5-6.0	Low------------	0.43	
PrB---------------Providence	0-6	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	3
	6-22	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	
	22-34	0.2-0.6	0.08-0.10	4.5-6.0	Moderate--------	0.32	
	34-60	0.2-0.6	0.08-0.10	4.5-6.0	Low------------	0.32	
PrC2, PrD2--------Providence	0-6	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	3
	6-16	0.6-2.0	0.20-0.22	4.5-6.0	Low------------	0.43	
	16-34	0.2-0.6	0.08-0.10	4.5-6.0	Moderate--------	0.32	
	34-60	0.2-0.6	0.08-0.10	4.5-6.0	Low------------	0.32	
SmD2--------------Smithdale	0-5	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	5
	5-38	0.6-2.0	0.15-0.17	4.5-5.5	Low------------	0.24	
	38-60	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	
SmE---------------Smithdale	0-11	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	5
	11-43	0.6-2.0	0.15-0.17	4.5-5.5	Low------------	0.24	
	43-70	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	
SmE3--------------Smithdale	0-5	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	5
	5-38	0.6-2.0	0.15-0.17	4.5-5.5	Low------------	0.24	
	38-60	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T
	In	In/hr	In/in	pH			
SwD-------------- Sweatman	0-4	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.37	3
	4-22	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	22-32	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	32-60	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-------	----	
SwE-------------- Sweatman	0-8	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.37	3
	8-30	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	30-36	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	36-60	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-------	----	
SwE3------------- Sweatman	0-4	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.37	3
	4-22	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	22-32	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	32-60	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-------	----	
Up:* Udorthents.							
Pits.							
Us:* Udorthents.							
Smithdale--------	0-5	2.0-6.0	0.14-0.16	4.5-5.5	Low------------	0.28	5
	5-60	0.6-2.0	0.15-0.17	4.5-5.5	Low------------	0.24	
Uw:* Udorthents.							
Sweatman---------	0-5	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.37	3
	5-30	0.2-0.6	0.16-0.20	4.5-5.5	Moderate-------	0.28	
	30-60	0.2-0.6	0.10-0.18	4.5-5.5	Moderate-------	----	
Wf--------------- Waverly	0-60	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	3
Wo--------------- Waverly	0-7	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	3
	7-60	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	
Wp--------------- Waverly	0-8	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	3
	8-60	0.6-2.0	0.20-0.22	4.5-5.5	Low------------	0.43	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
Ca----------------- Calloway	C	None---------	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High------	Moderate.
Co----------------- Collins	C	Occasional	Brief------	Jan-Apr	2.0-5.0	Apparent	Jan-Apr	>60	---	Moderate	Moderate.
Fa----------------- Falaya	D	Occasional	Brief to long.	Dec-Apr	1.0-2.0	Apparent	Dec-Apr	>60	---	High------	Moderate.
GrB, GrC3---------- Grenada	C	None---------	---	---	1.5-2.5	Perched	Jan-Apr	>60	---	Moderate	Moderate.
LeB, LeC2, LeD2---- Lexington	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
LoB, LoB3, LoC3, LoD3-------------- Loring	C	None---------	---	---	2.0-3.0	Perched	Dec-Mar	>60	---	Moderate	Moderate.
PrB, PrC2, PrD2---- Providence	C	None---------	---	---	1.5-3.0	Perched	Jan-Mar	>60	---	Moderate	Moderate.
SmD2, SmE, SmE3---- Smithdale	B	None---------	---	---	>6.0	---	---	>60	---	Low-------	Moderate.
SwD, SwE, SwE3----- Sweatman	C	None---------	---	---	>6.0	---	---	>60	---	High------	High.
Up:* Udorthents.											
Pits.											
Us:* Udorthents.											
Smithdale---------	B	None---------	---	---	>6.0	---	---	>60	---	Low-------	Moderate.
Uw:* Udorthents.											
Sweatman----------	C	None---------	---	---	>6.0	---	---	>60	---	High------	High.
Wf----------------- Waverly	B/D	Frequent-----	Brief to long.	Jan-Mar	0.5-1.0	Apparent	Dec-Apr	>60	---	High------	Moderate.
Wo----------------- Waverly	B/D	Occasional	Brief to long.	Jan-Mar	0.5-1.0	Apparent	Dec-Apr	>60	---	High------	Moderate.
Wp**--------------- Waverly	B/D	None---------	---	---	+1-1.0	Apparent	Dec-Apr	>60	---	High------	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

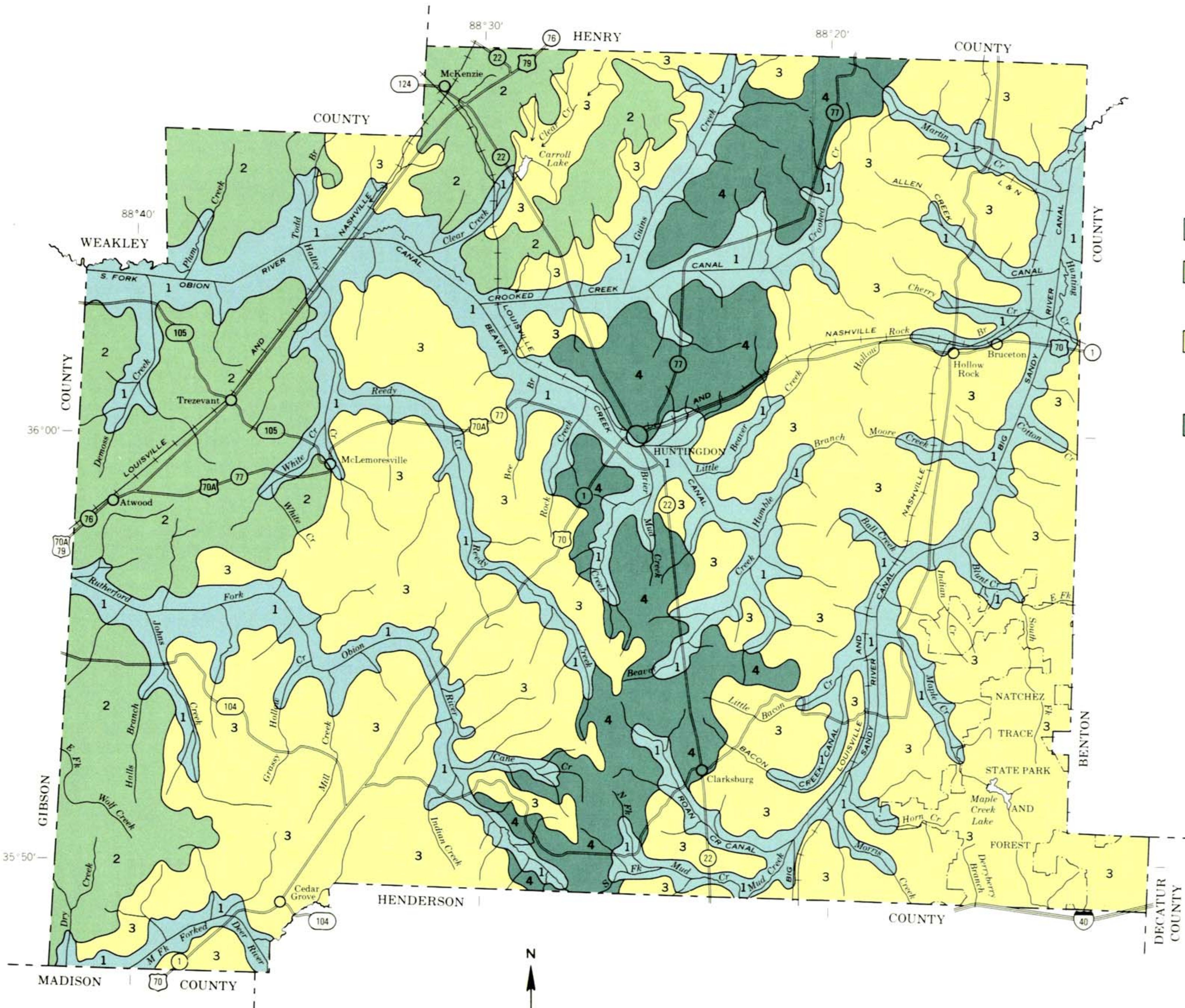
** In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table rises above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 16.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Collins	Coarse-silty, mixed, acid, thermic Aquic Udifluvents
Falaya	Coarse-silty, mixed, acid, thermic Aeric Fluvaquents
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Lexington	Fine-silty, mixed, thermic Typic Paleudalfs
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Providence	Fine-silty, mixed, thermic Typic Fragiudalfs
Smithdale	Fine-loamy, siliceous, thermic Typic Paleudults
Sweatman	Clayey, mixed, thermic Typic Hapludults
Waverly	Coarse-silty, mixed, acid, thermic Typic Fluvaquents

☆U.S. GPO: 1984-357-843/10009

NRCS Accessibility Statement



LEGEND

1	WAVERLY-FALAYA-COLLINS: Level, poorly drained to moderately well drained soils; on flood plains
2	LEXINGTON-GRENADA-LORING: Gently sloping to strongly sloping, well drained and moderately well drained soils formed in moderately deep loess and underlying Coastal Plain sediment; on uplands
3	SMITHDALE-LEXINGTON-PROVIDENCE: Steep to gently sloping, well drained and moderately well drained soils formed in loamy Coastal Plain sediment and in moderately deep loess and underlying Coastal Plain sediment; on dissected uplands
4	GRENADA-SWEATMAN: Gently sloping to steep, moderately well drained and well drained soils formed in moderately deep loess and underlying loamy and clayey Coastal Plain sediment and in clayey Coastal Plain sediment; on uplands

Compiled 1982

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TENNESSEE AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

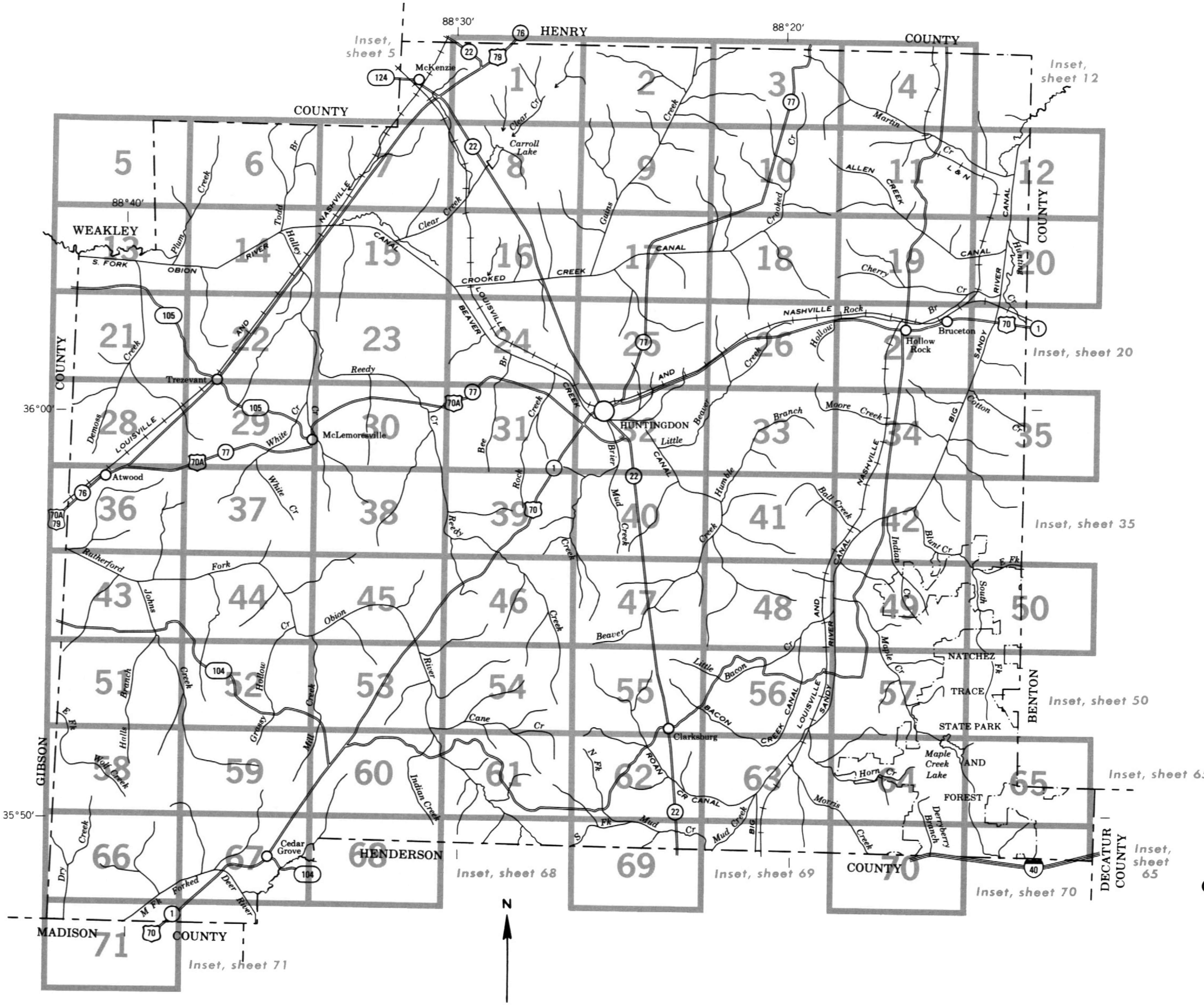
CARROLL COUNTY, TENNESSEE

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

CARROLL COUNTY, TENNESSEE

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

Map symbols will be published as letters and numbers. The first letter, always a capital, is the initial letter of the soil name. The second letter is a small letter and is not connotative. The third letter, if used, is always a capital and connotes the slope. A fourth digit, if used, is a number and connotes erosion. Symbols without slope letters are those of nearly level soils or are mapping units that are non-arable with a considerable range in slope gradient.

SYMBOL	NAME
Ca	Calloway silt loam
Co	Collins silt loam, occasionally flooded
Fa	Falaya silt loam, occasionally flooded
GrB	Grenada silt loam, 2 to 5 percent slopes
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded
LeB	Lexington silt loam, 2 to 5 percent slopes
LeC2	Lexington silt loam, 5 to 8 percent slopes, eroded
LeD2	Lexington silt loam, 8 to 12 percent slopes, eroded
LoB	Loring silt loam, 2 to 5 percent slopes
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded
PrB	Providence silt loam, 2 to 5 percent slopes
PrC2	Providence silt loam, 5 to 8 percent slopes, eroded
PrD2	Providence silt loam, 8 to 12 percent slopes, eroded
SmD2	Smithdale fine sandy loam, 8 to 12 percent slopes, eroded
SmE	Smithdale fine sandy loam, 12 to 20 percent slopes,
SmE3	Smithdale fine sandy loam, 12 to 20 percent slopes, severely eroded
SwD	Sweatman loam, 8 to 12 percent slopes
SwE	Sweatman loam, 12 to 20 percent slopes
SwE3	Sweatman loam, 12 to 20 percent slopes, severely eroded
Up	Udorthents-Pits complex
Us	Udorthents-Smithdale complex, gullied
Uw	Udorthents-Sweatman complex, gullied
Wf	Waverly silt loam, frequently flooded
Wo	Waverly silt loam, occasionally flooded
Wp	Waverly silt loam, ponded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label) — Hedley Airstrip

Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CnB, WaC2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

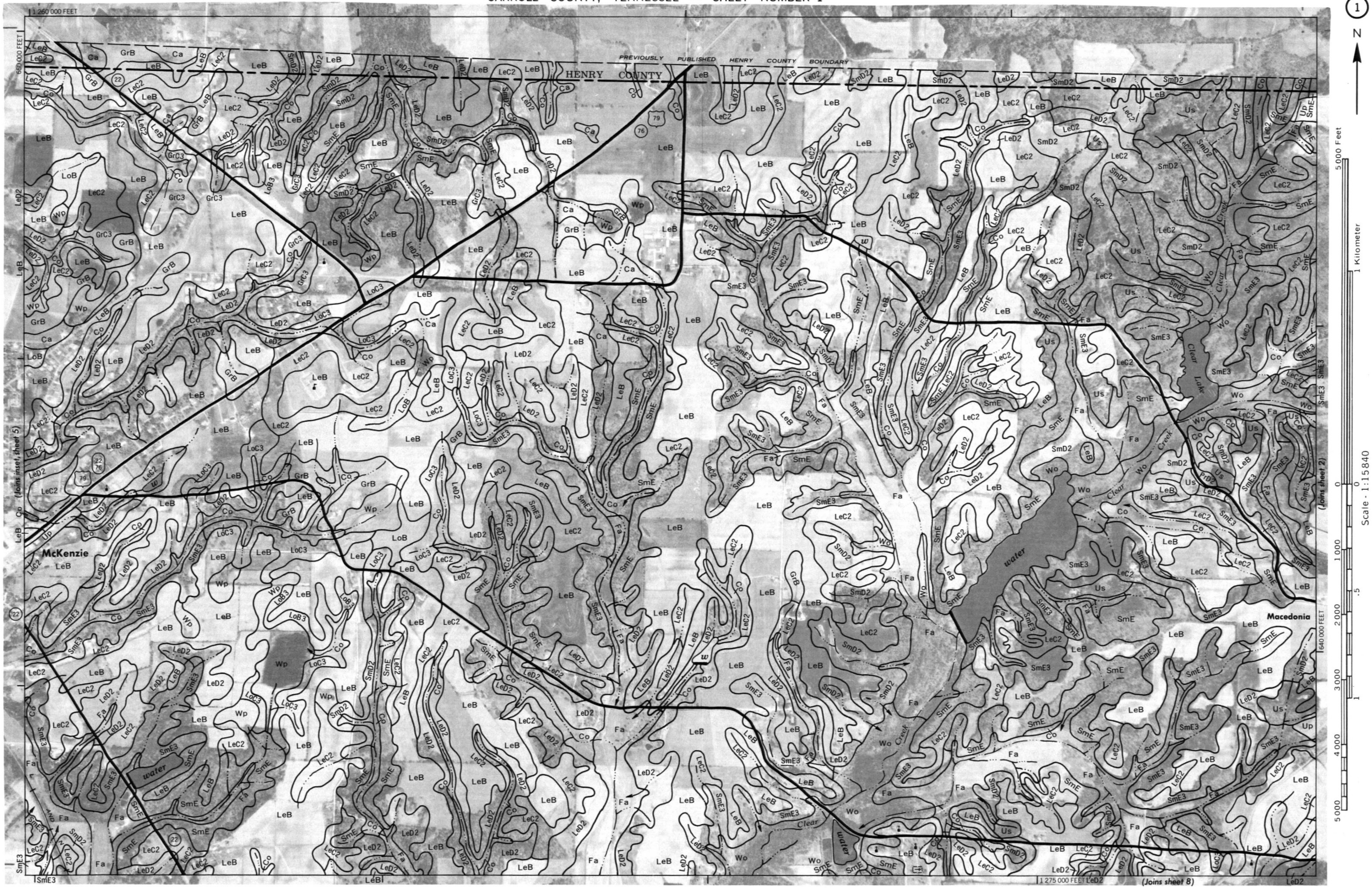
DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 1



CARROLL COUNTY, TENNESSEE NO. 1

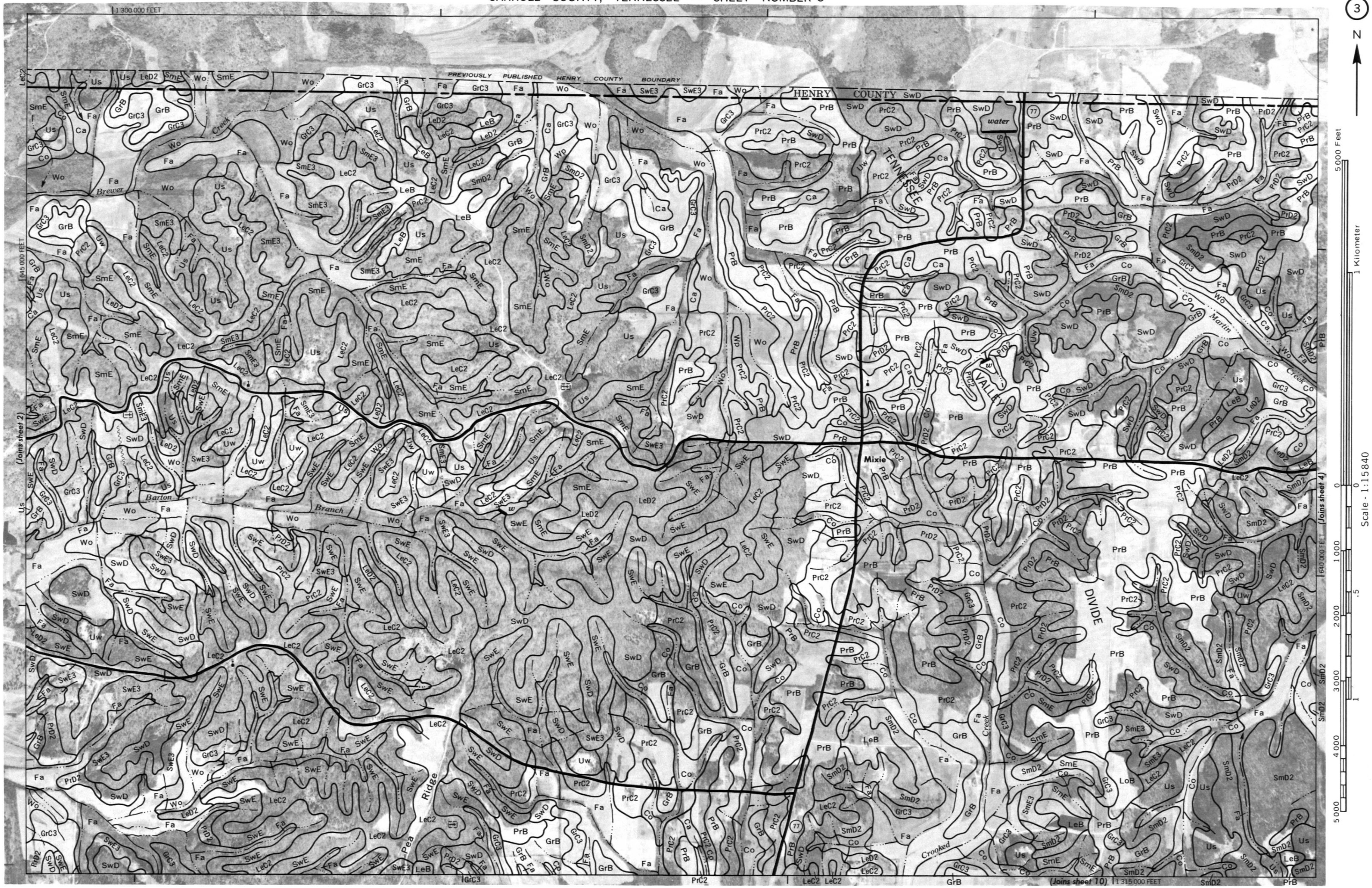
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned

2

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 2

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

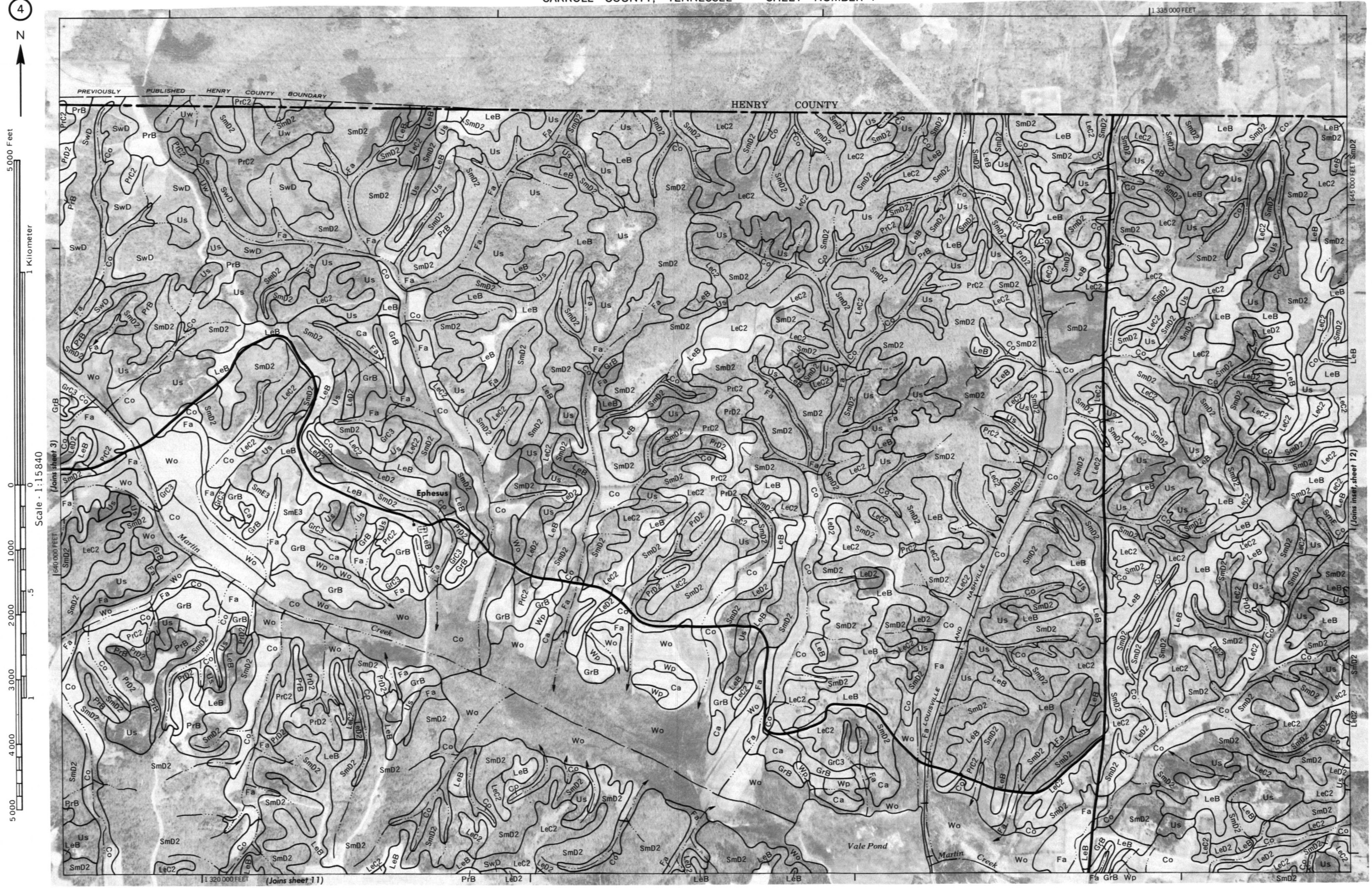
CARROLL COUNTY, TENNESSEE NO. 2



CARROLL COUNTY, TENNESSEE NO. 3

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 4

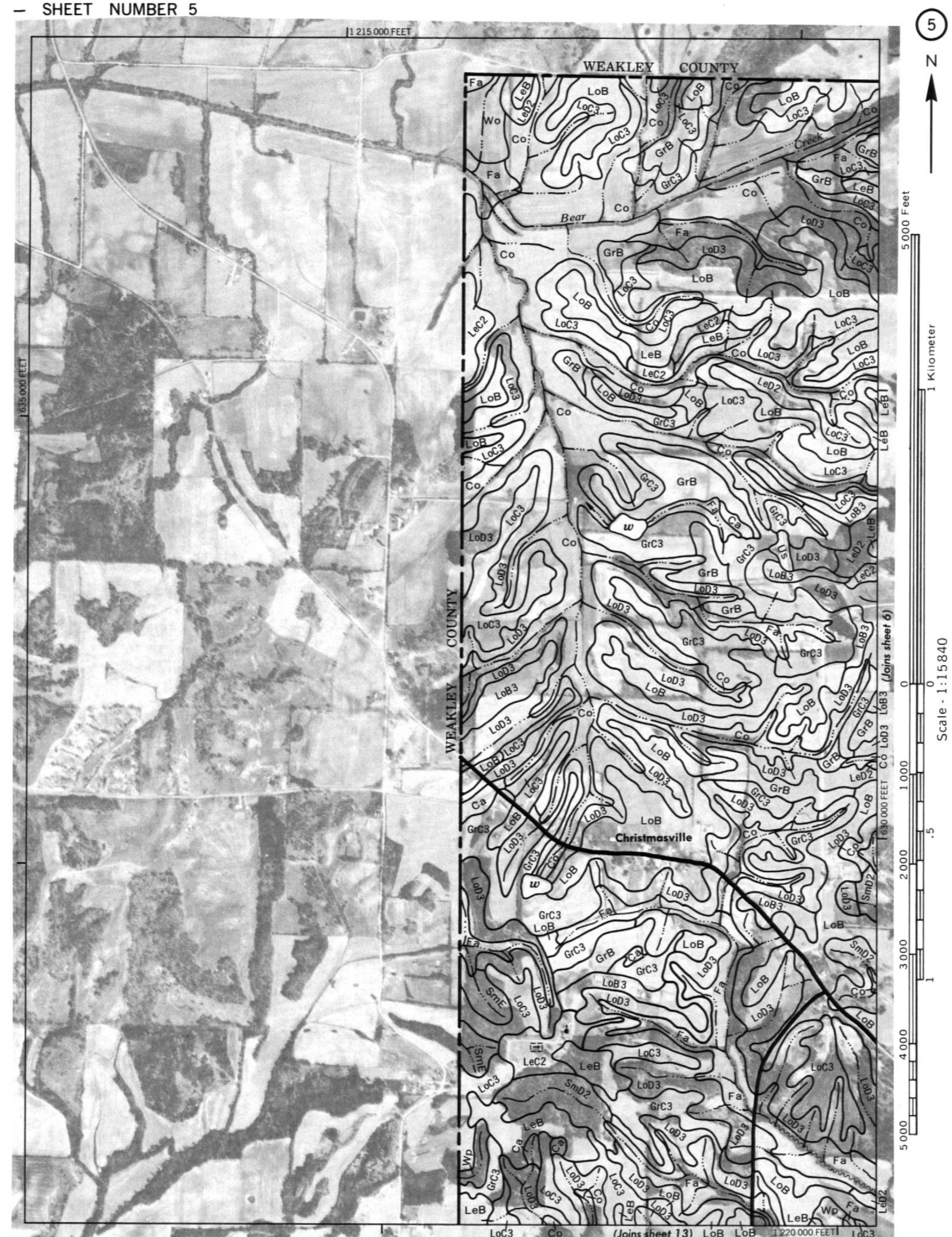


This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

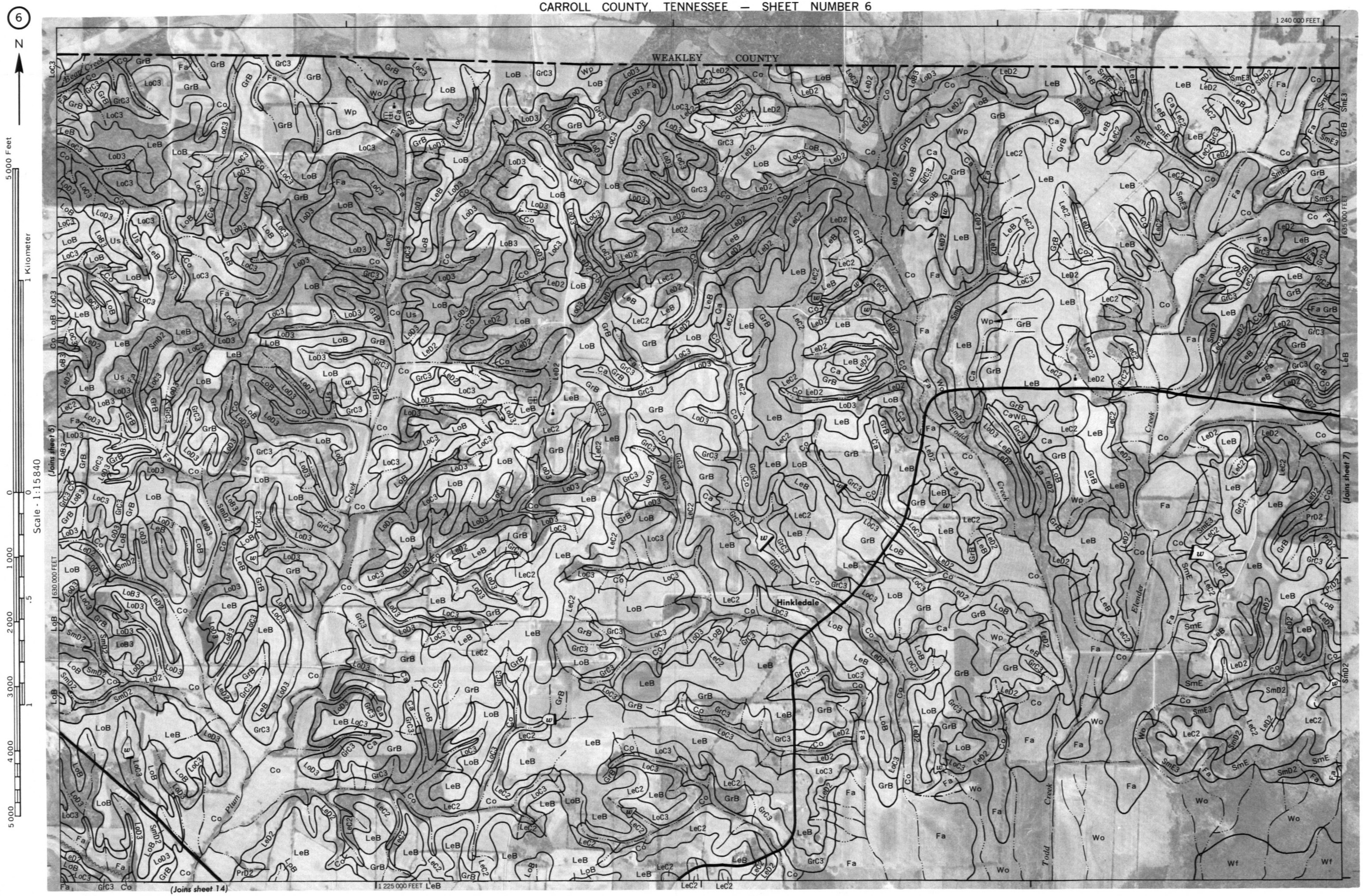
CARROLL COUNTY, TENNESSEE NO. 4

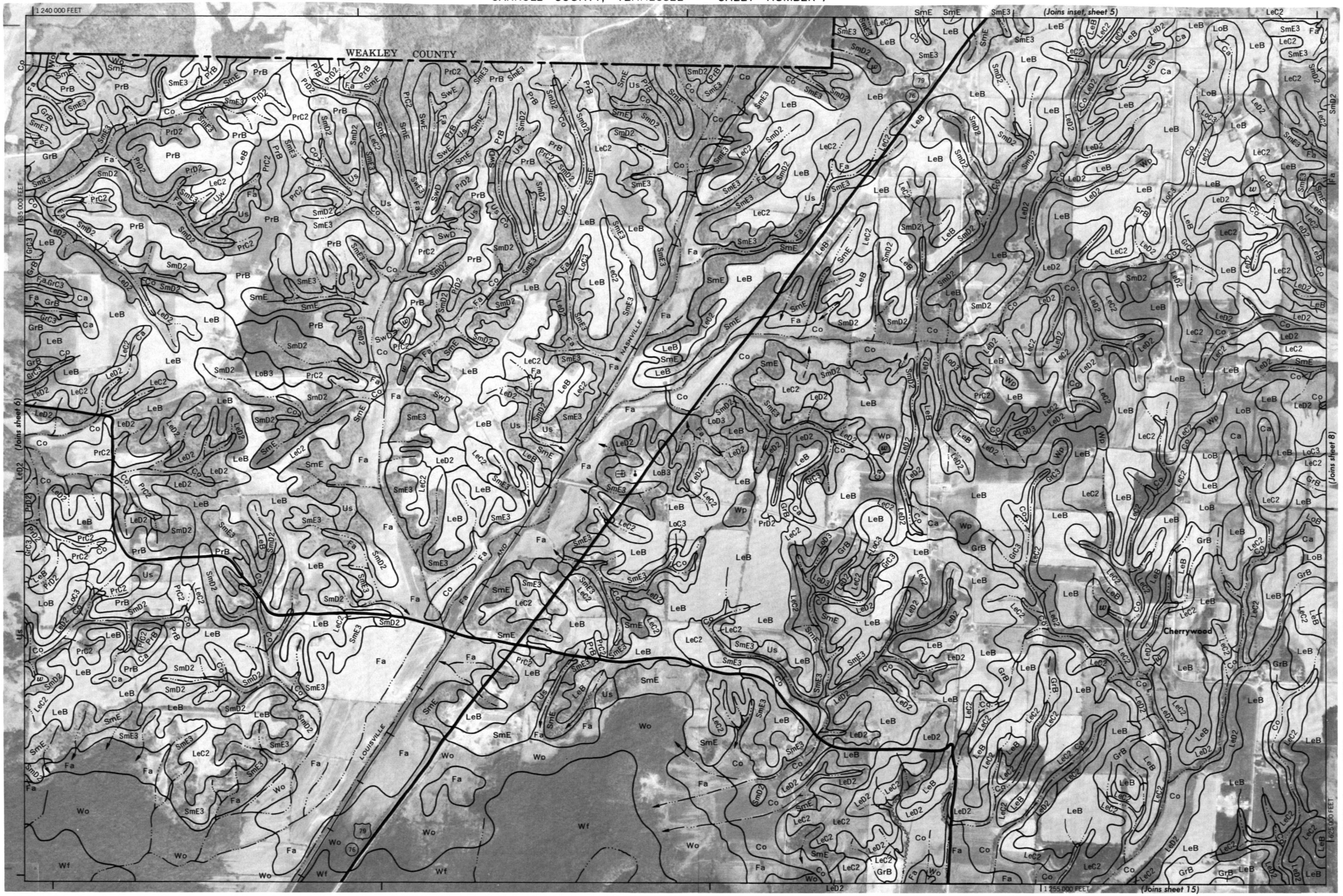
CARROLL COUNTY, TENNESSEE NO. 5

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CARROLL COUNTY, TENNESSEE — SHEET NUMBER 6





N

Scale - 1:15 840

1 Kilometer

.5

0

5000 Feet

1000

2000

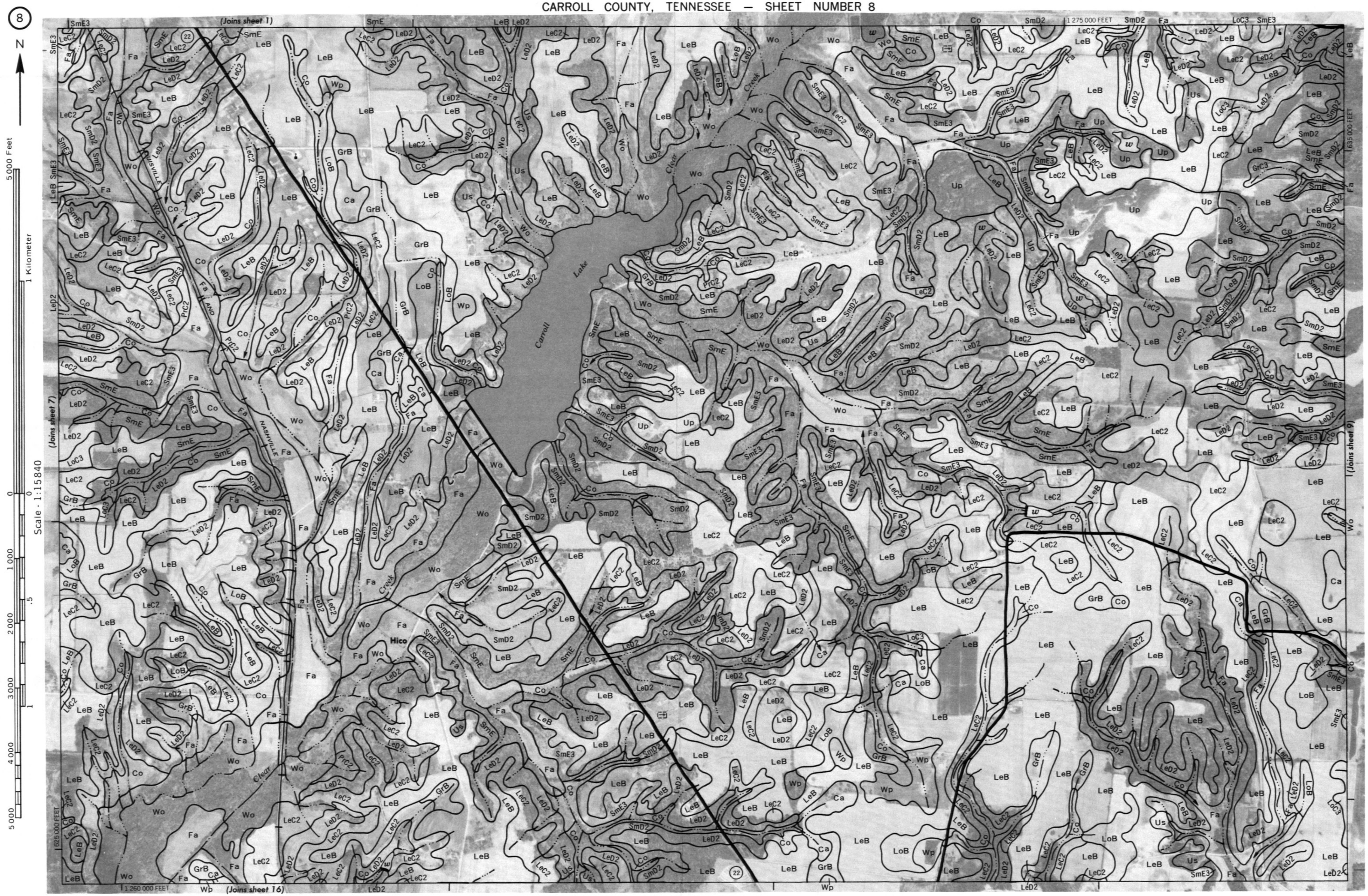
3000

4000

5000

CARROLL COUNTY, TENNESSEE NO. 7

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 9

CARROLL COUNTY, TENNESSEE NO. 9

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

10

N

5 000 Feet

1 Kilometer

Scale 1:15840

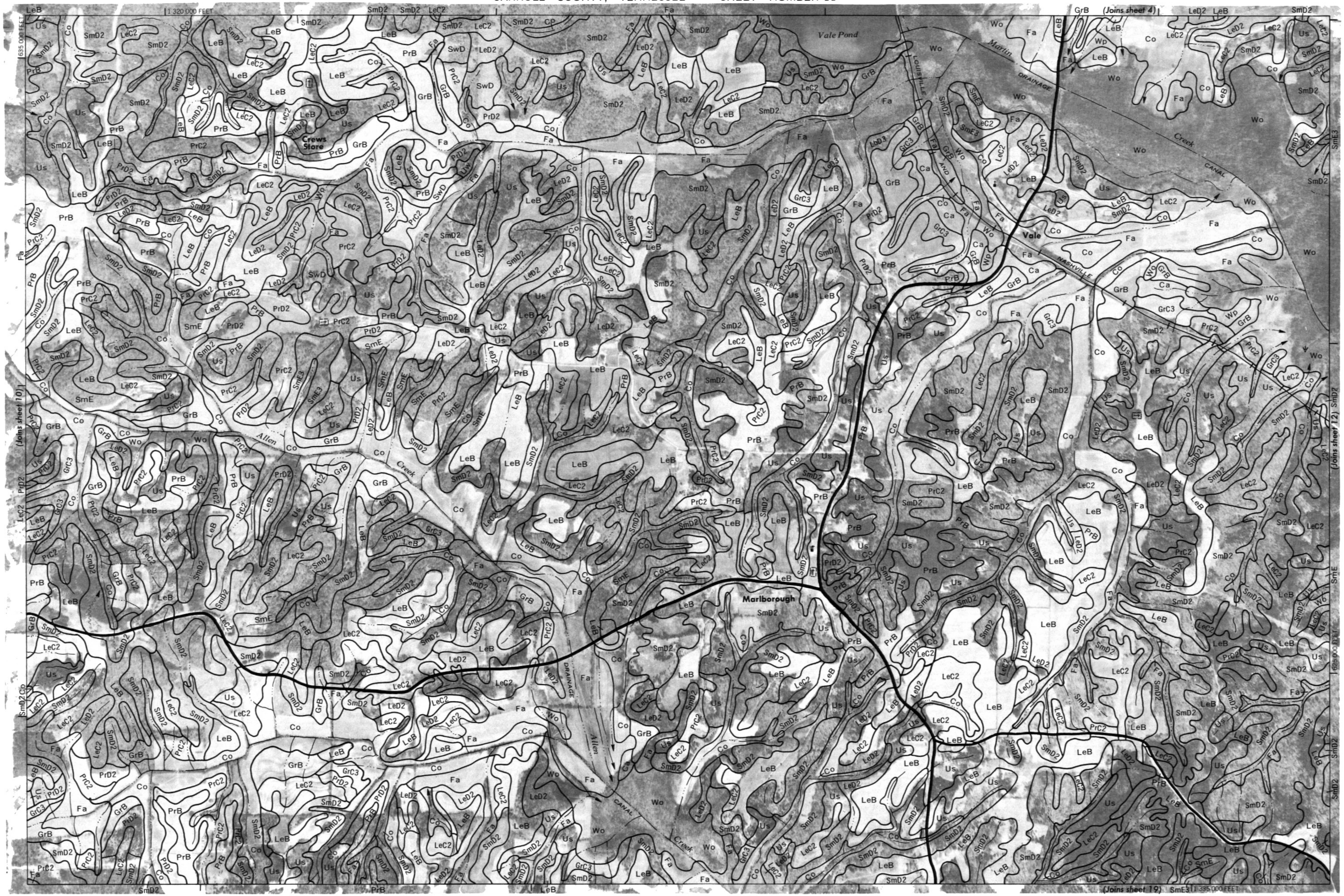
0
1000
2000
3000
4000
5000

0
.5
1

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

11

N



CARROLL COUNTY, TENNESSEE NO. 11

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

5000 Feet
1 Kilometer
Scale 1:15840
0 1000 2000 3000 4000 5000
0 .5 1

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 12

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 13

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

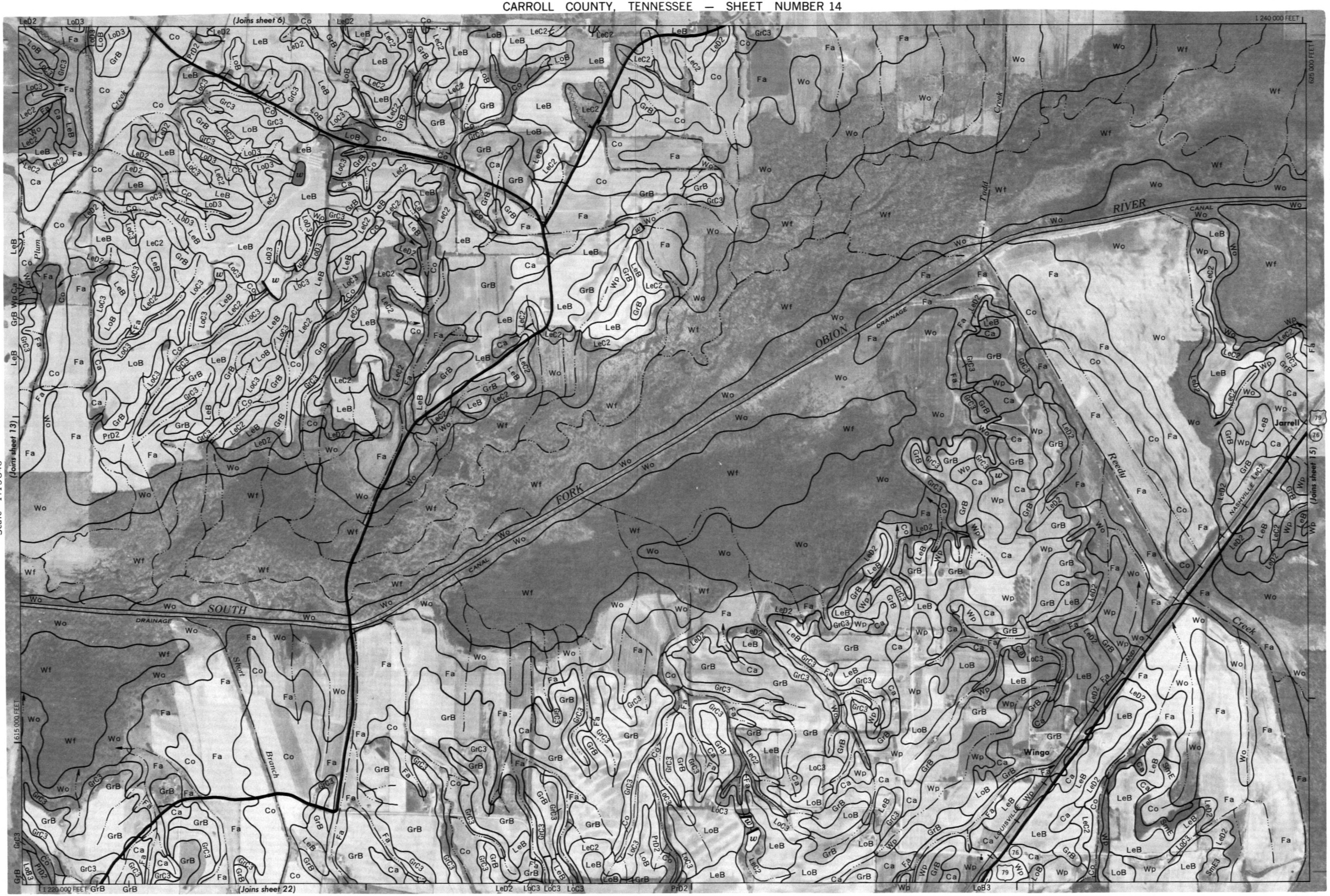
CARROLL COUNTY, TENNESSEE — SHEET NUMBER 14

N

Scale - 1:15840

5 000 Feet · 4 000 · 3 000 · 2 000 · 1 000 · 0

1 Kilometer · .5 · 0

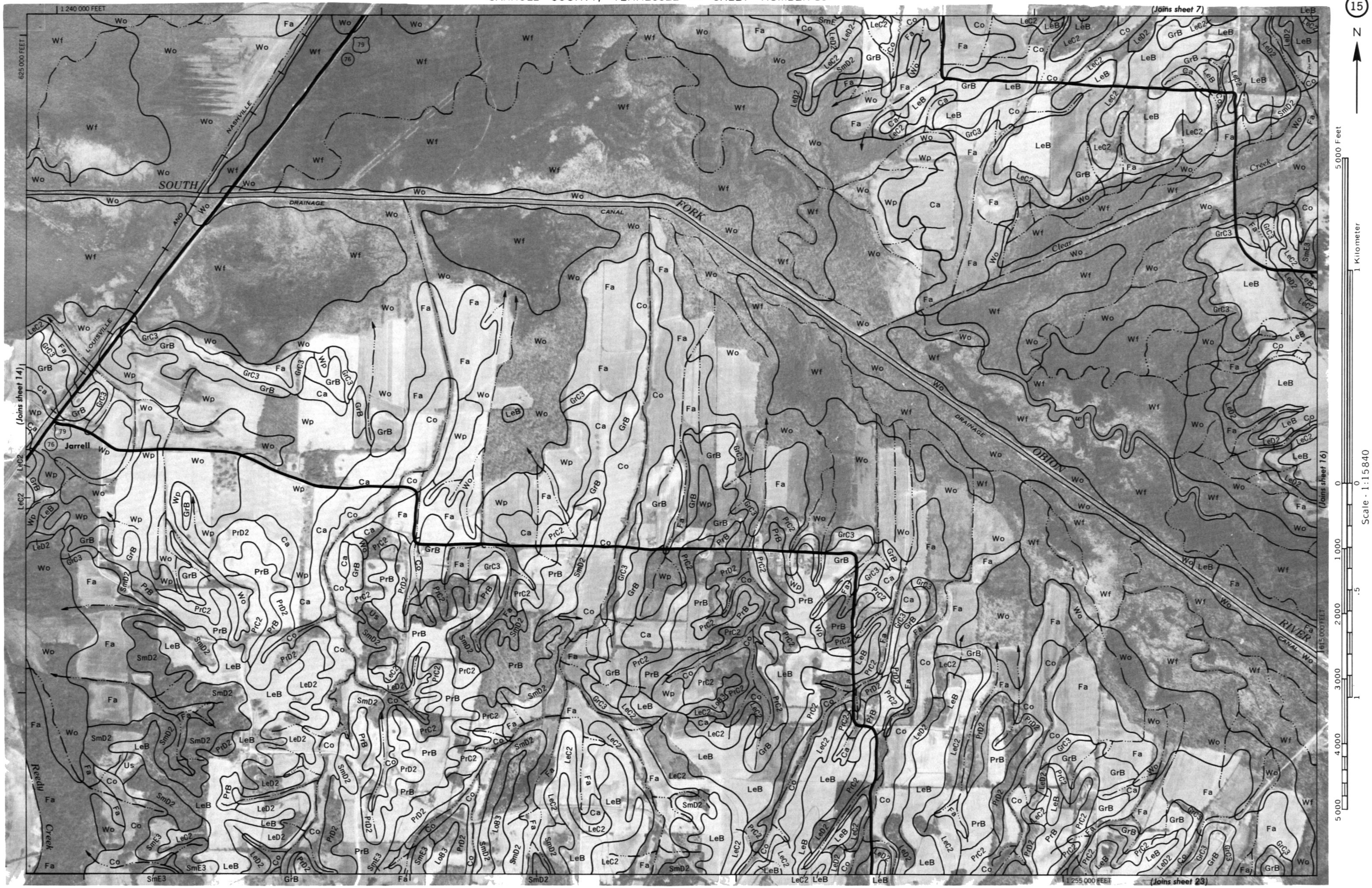


This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 14

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 15

15



CARROLL COUNTY, TENNESSEE NO. 15

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 16

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

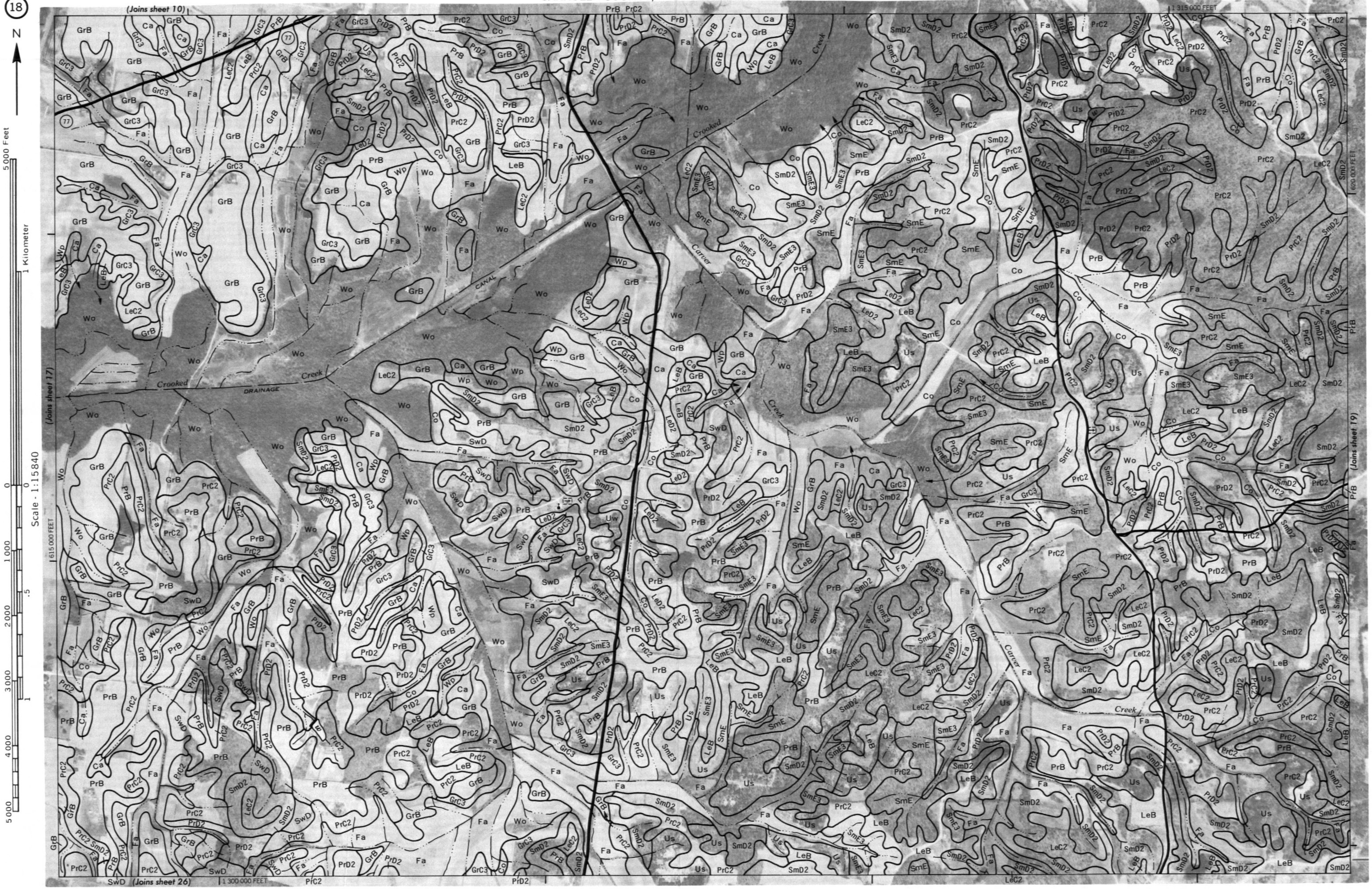
CARROLL COUNTY, TENNESSEE NO. 16

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 17

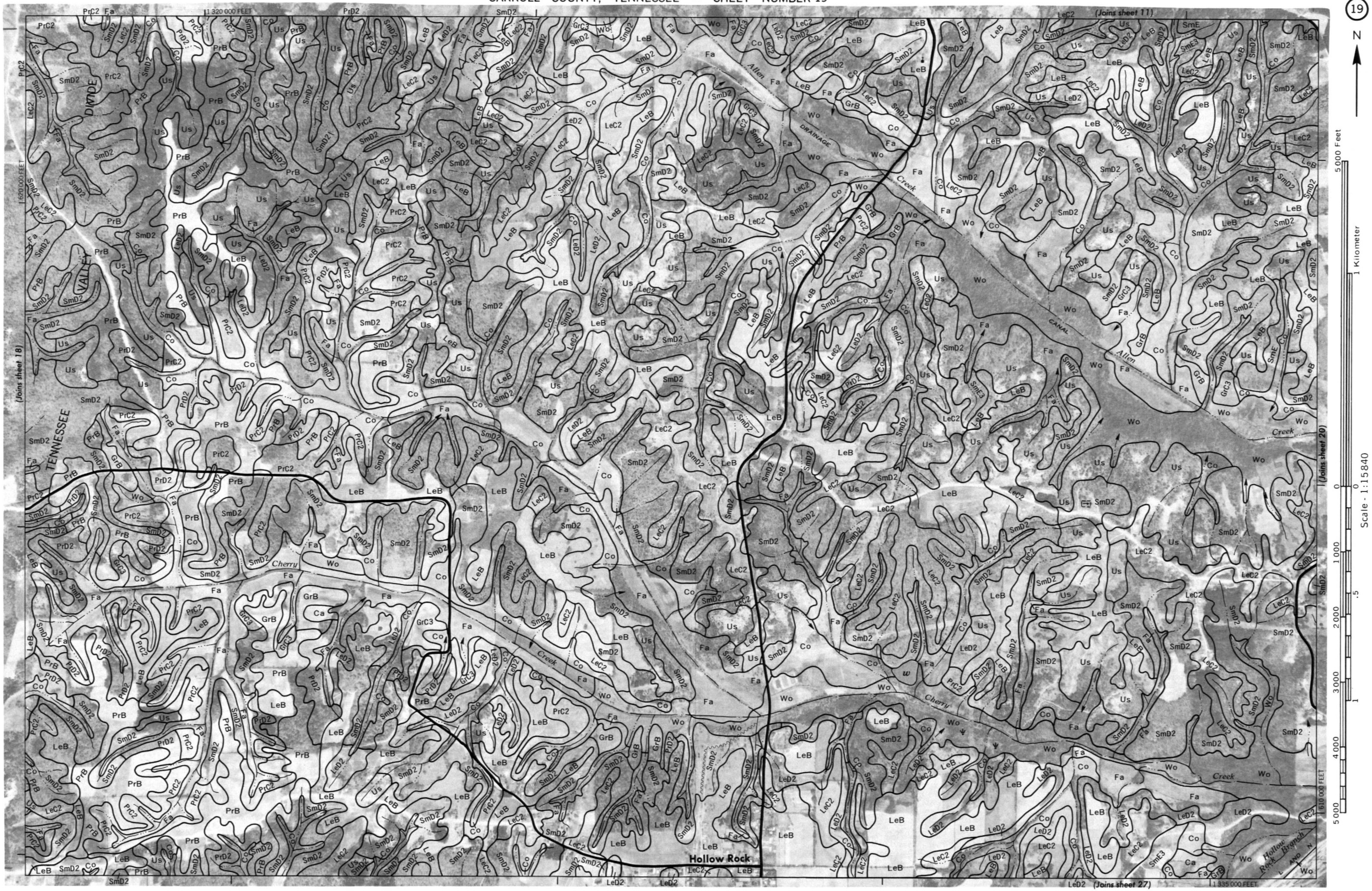
CARROLL COUNTY, TENNESSEE NO. 17

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 18



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CARROLL COUNTY, TENNESSEE NO. 19

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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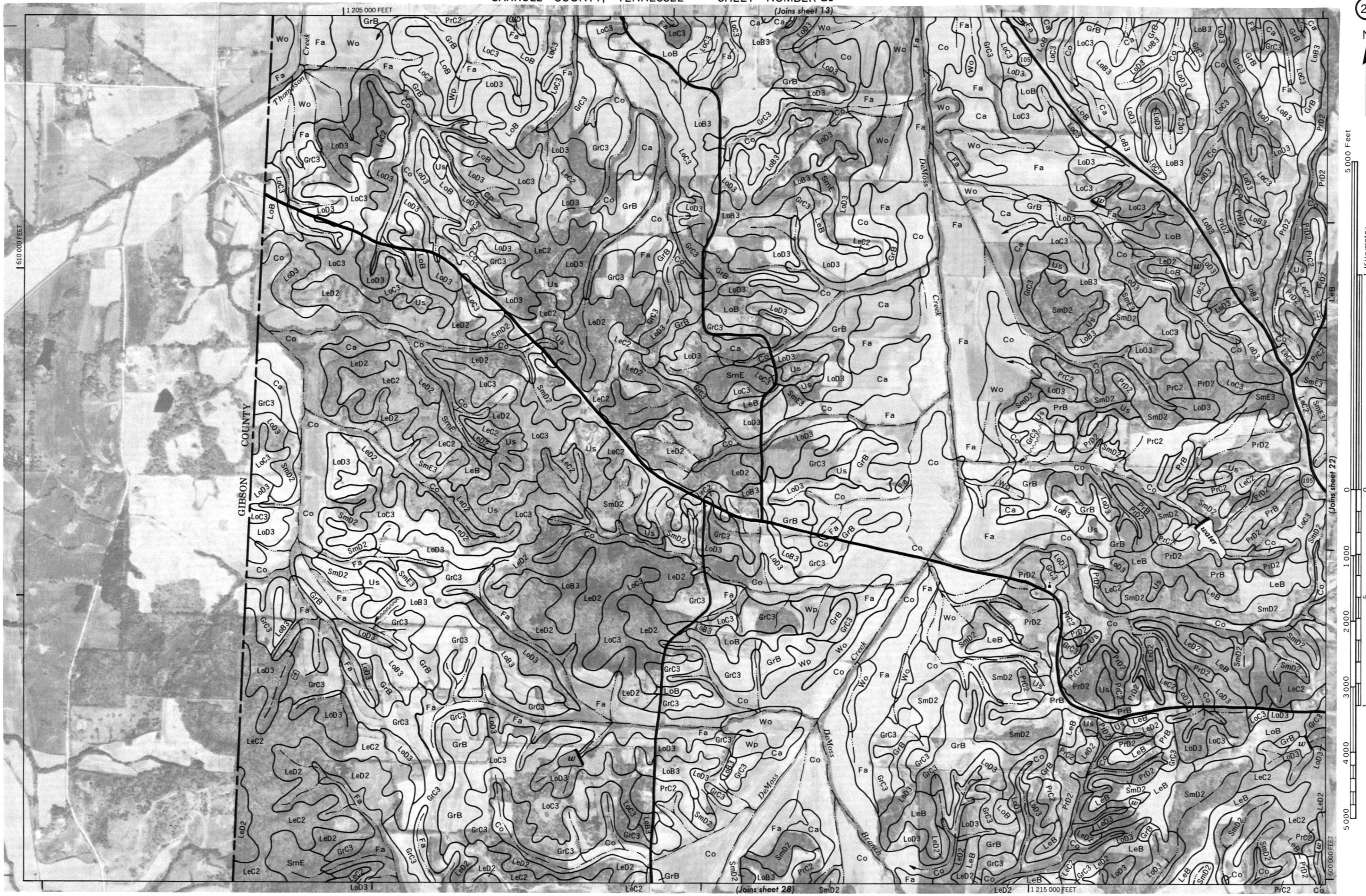


CARROLL COUNTY, TENNESSEE NO. 21

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 22

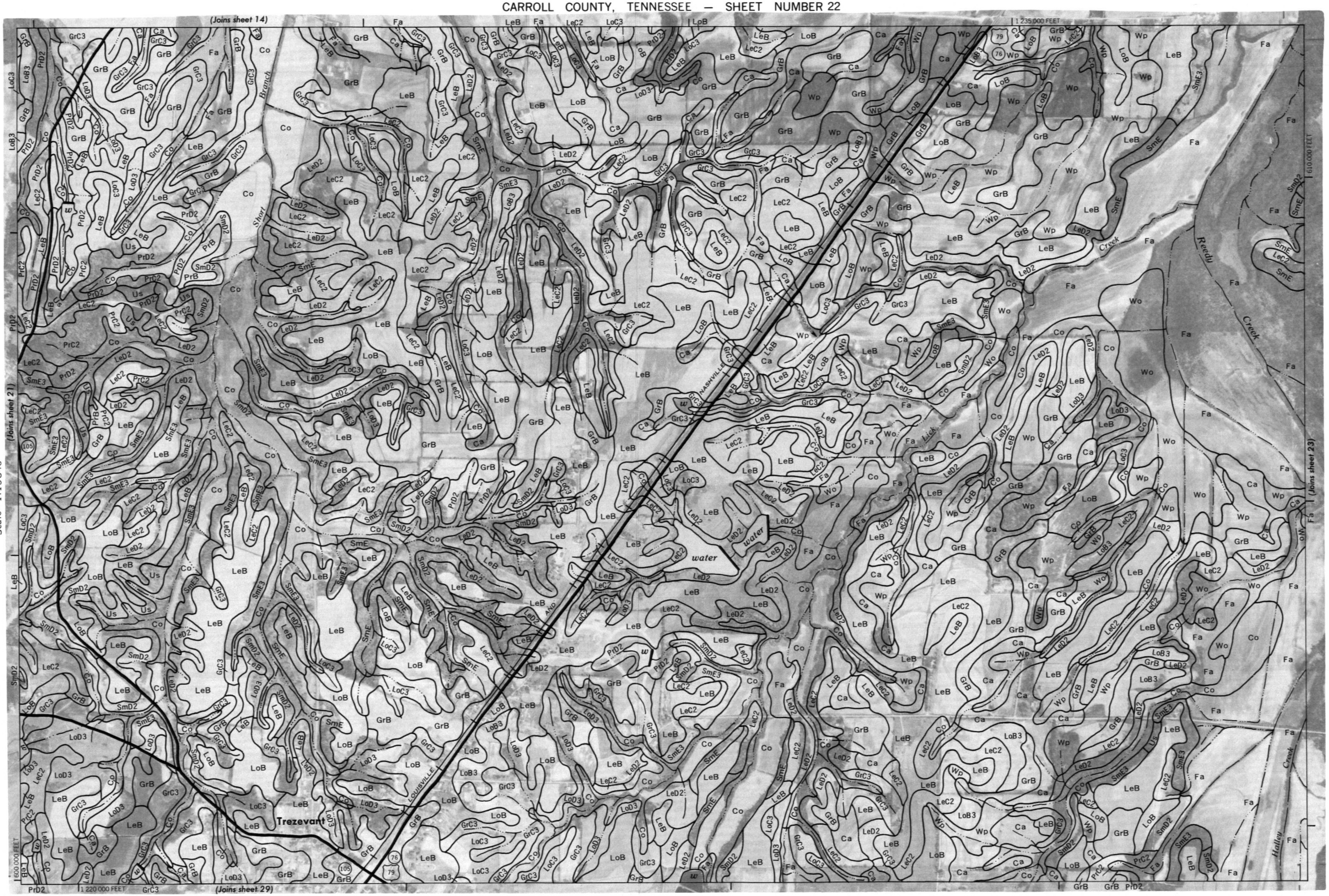
22

N

5000 Feet

1 Kilometer

Scale 1:15840



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 22

CARROLL COUNTY, TENNESSEE NO. 23

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

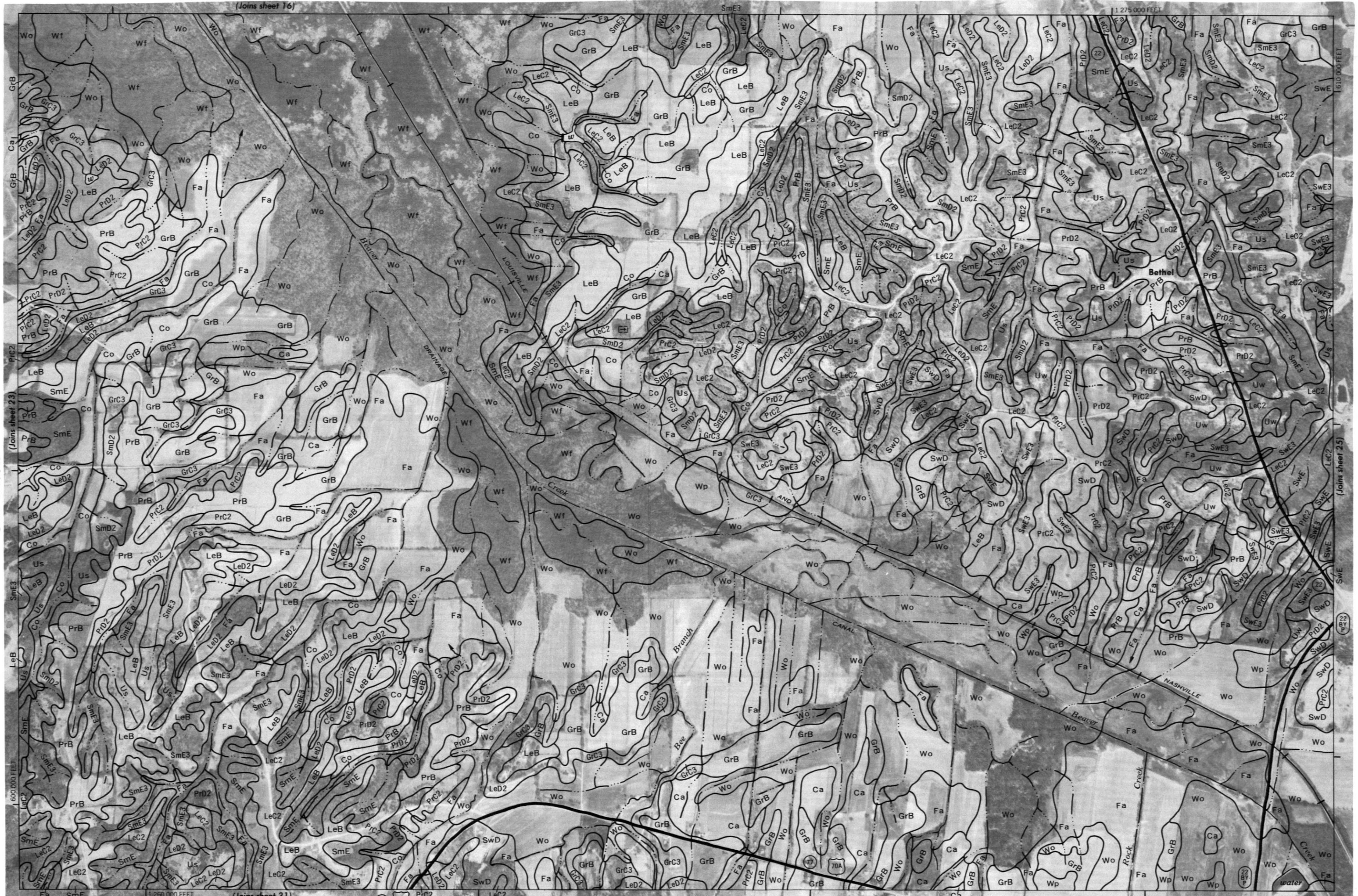
CARROLL COUNTY, TENNESSEE — SHEET NUMBER 24

N

5 000 Feet

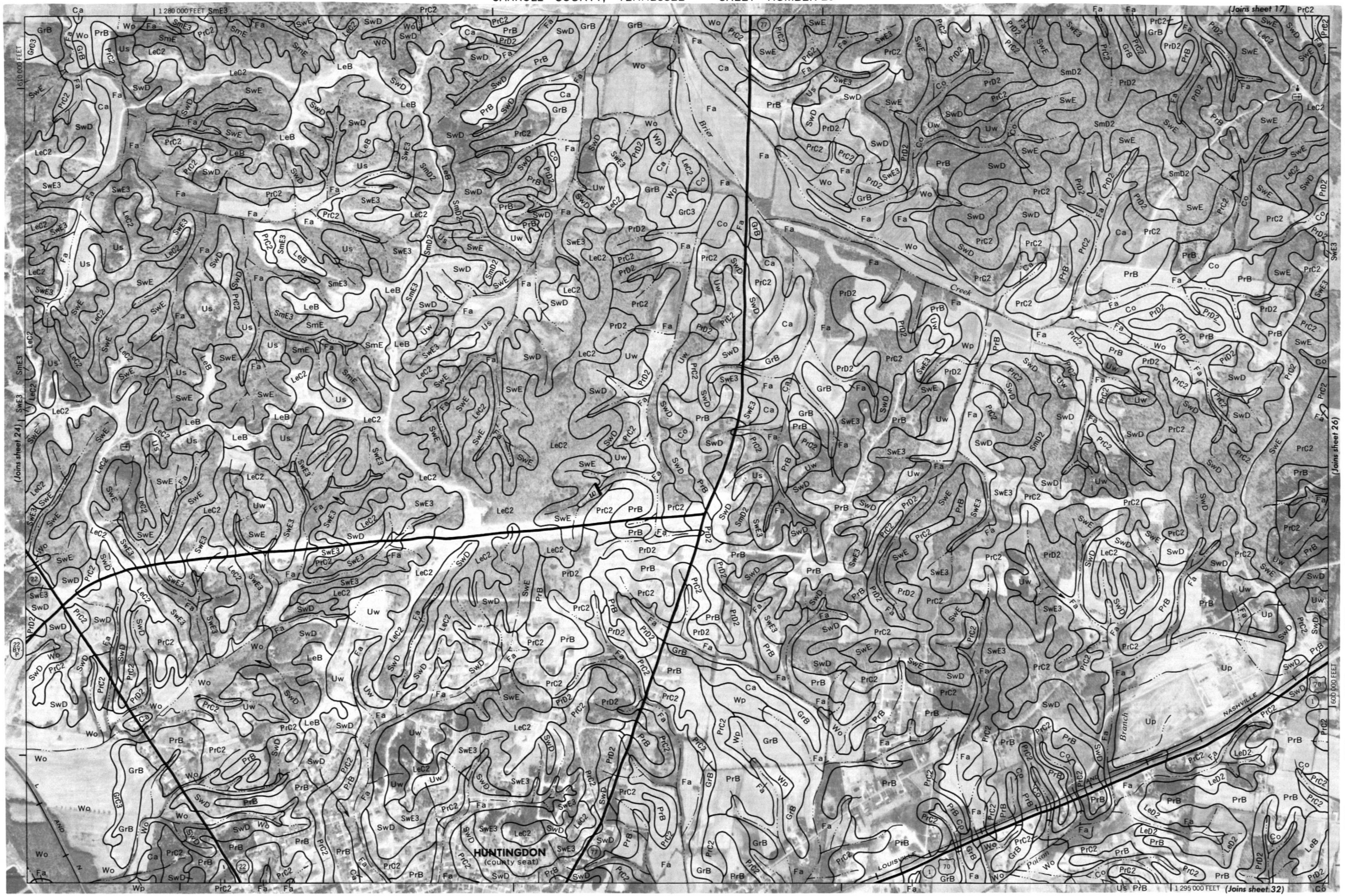
1 Kilometer

Scale - 1:15 840



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 24



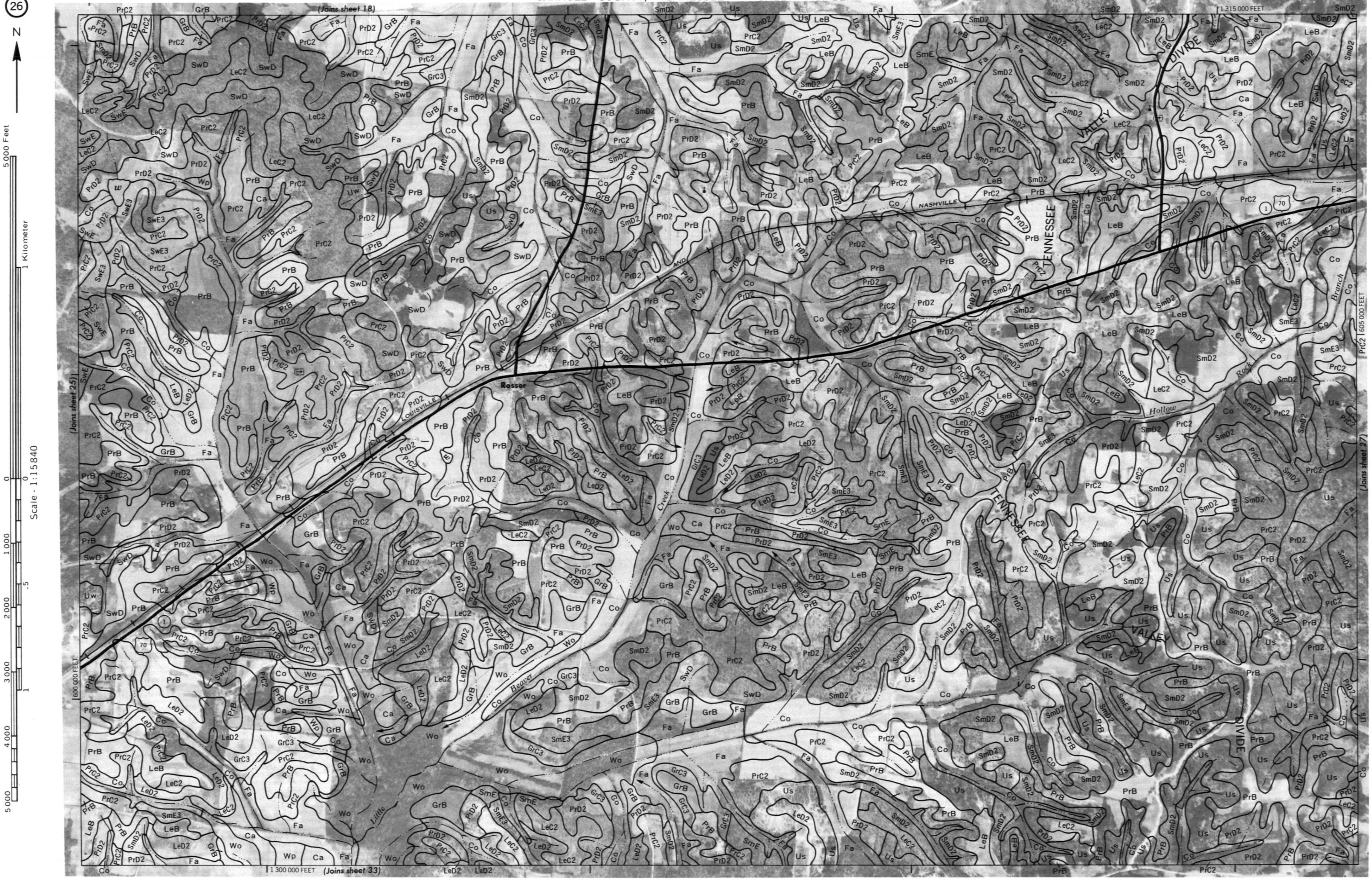
Scale - 1:15 840

1 Kilometer

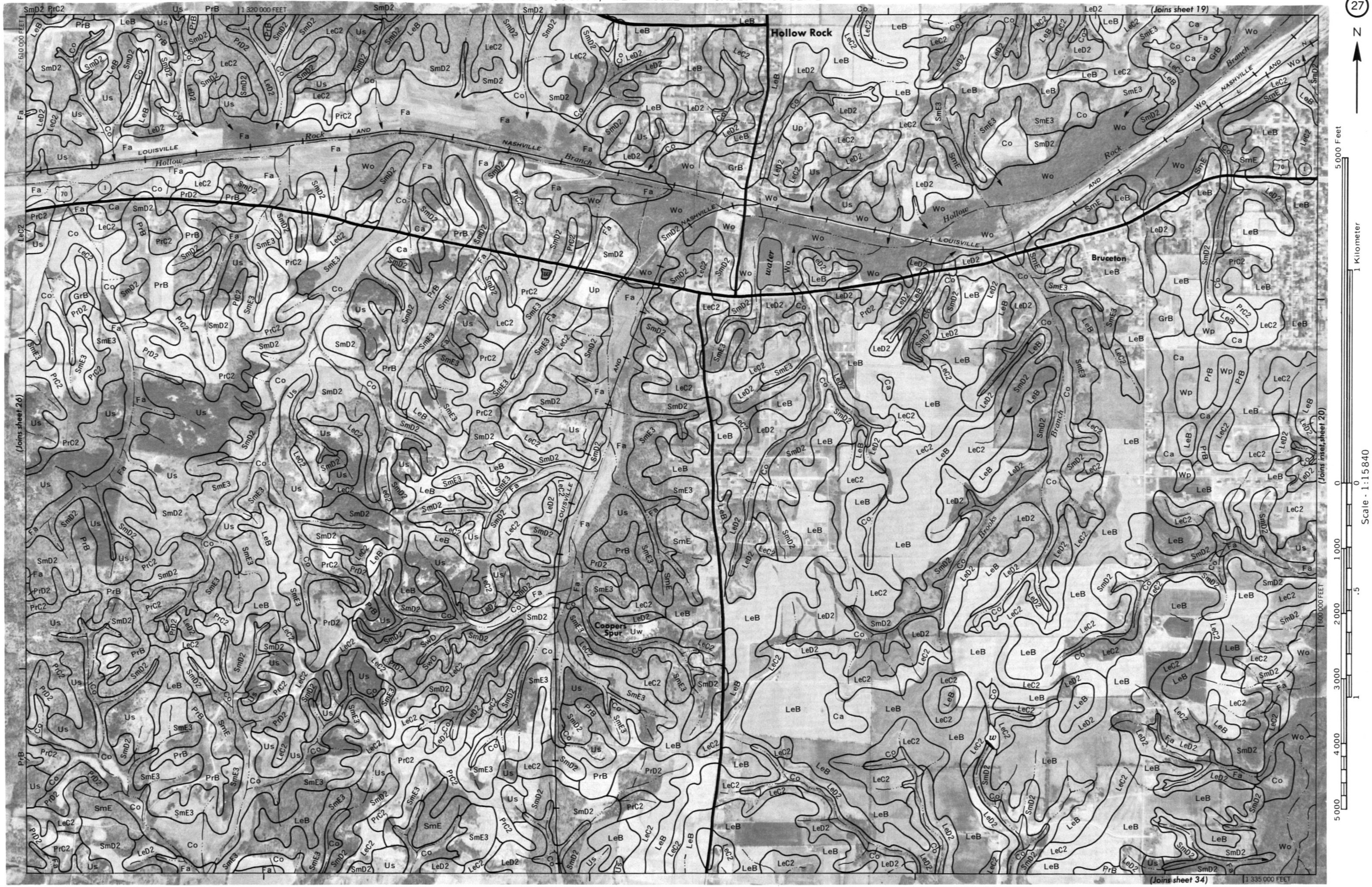
5000 Feet

CARROLL COUNTY, TENNESSEE NO. 25

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CARROLL COUNTY, TENNESSEE NO. 27

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(28)

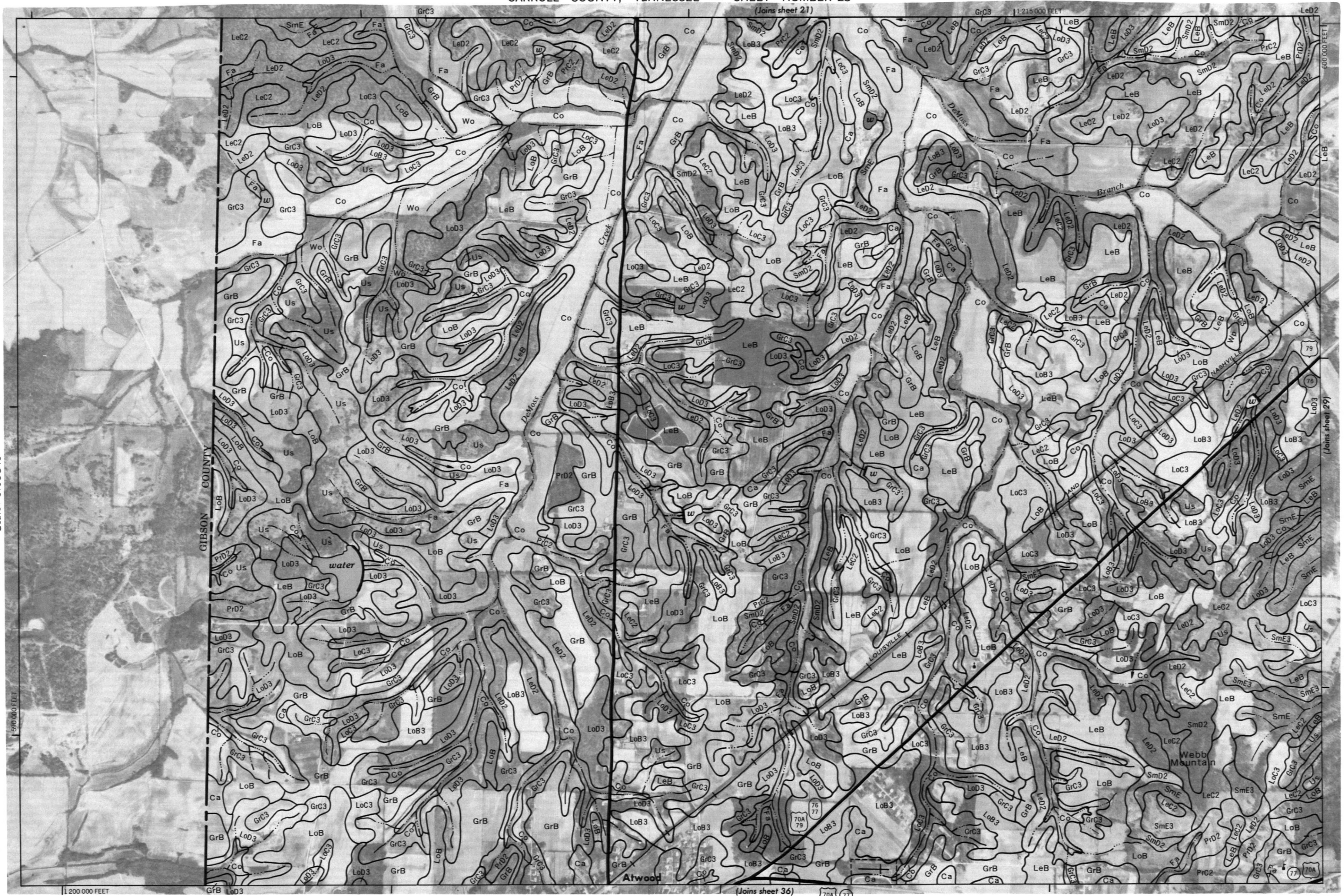
CARROLL COUNTY, TENNESSEE — SHEET NUMBER 28

N

5 000 Feet

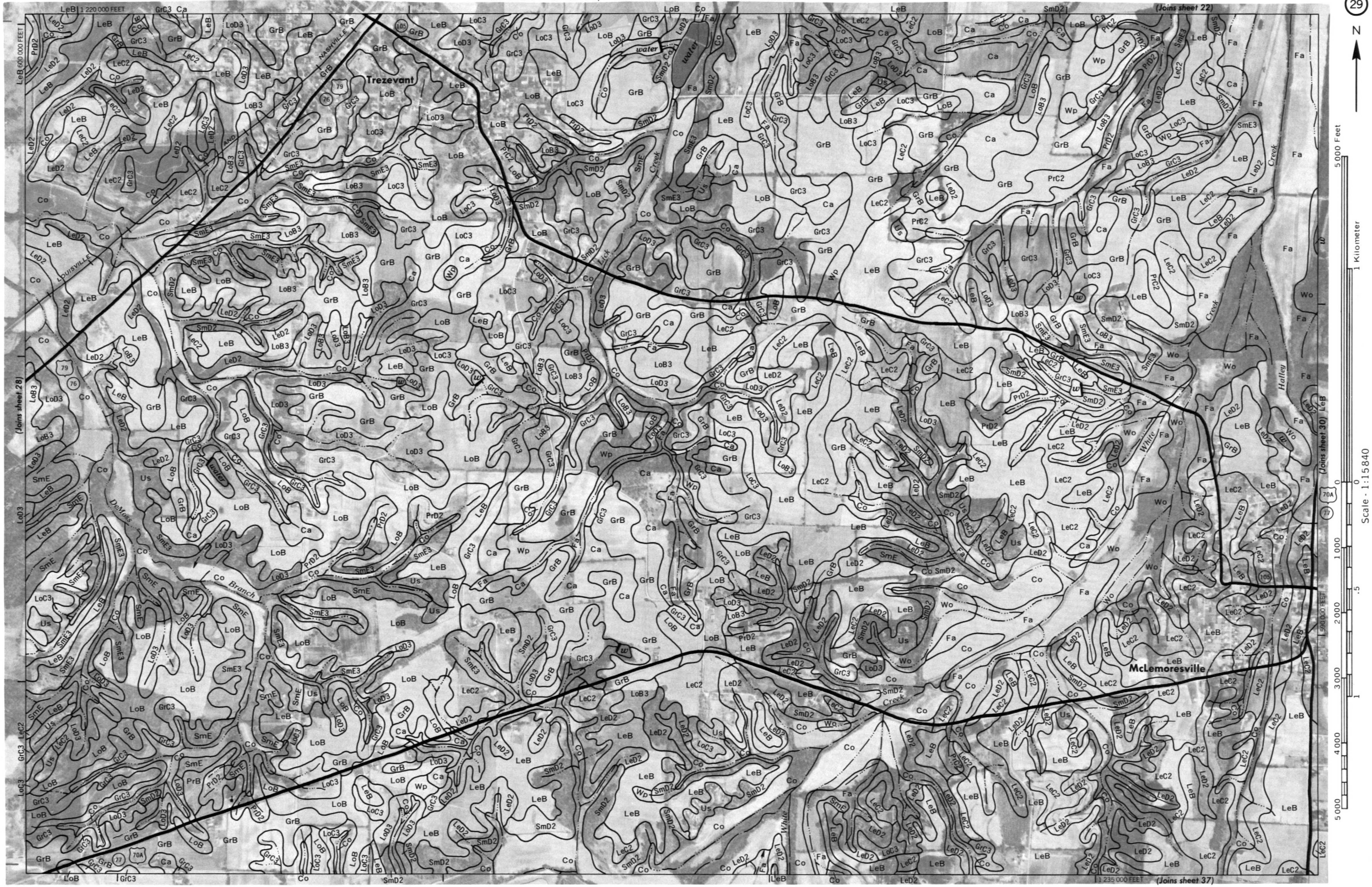
1 Kilometer

Scale 1:15840



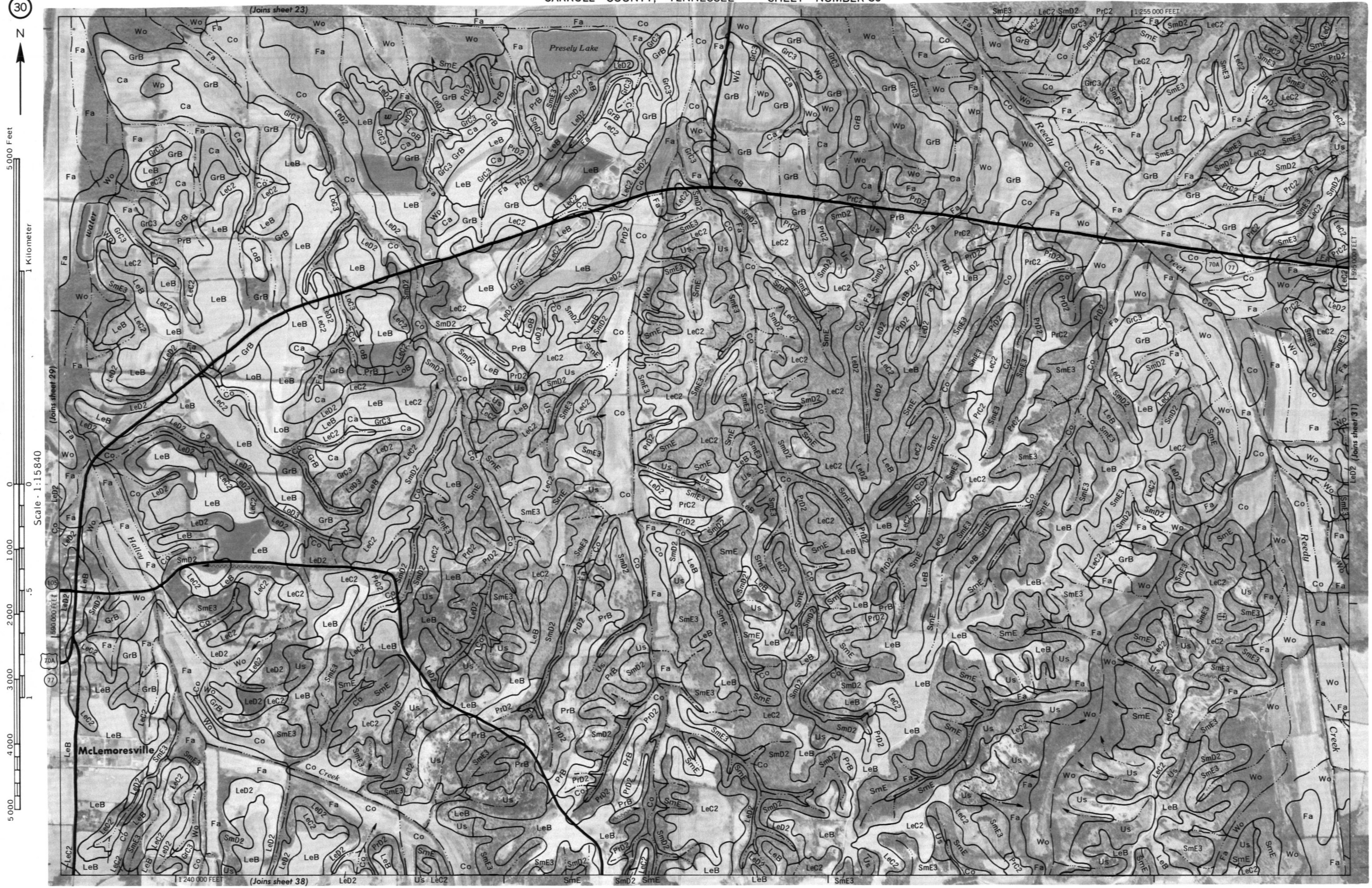
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 28



CARROLL COUNTY, TENNESSEE NO. 29

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



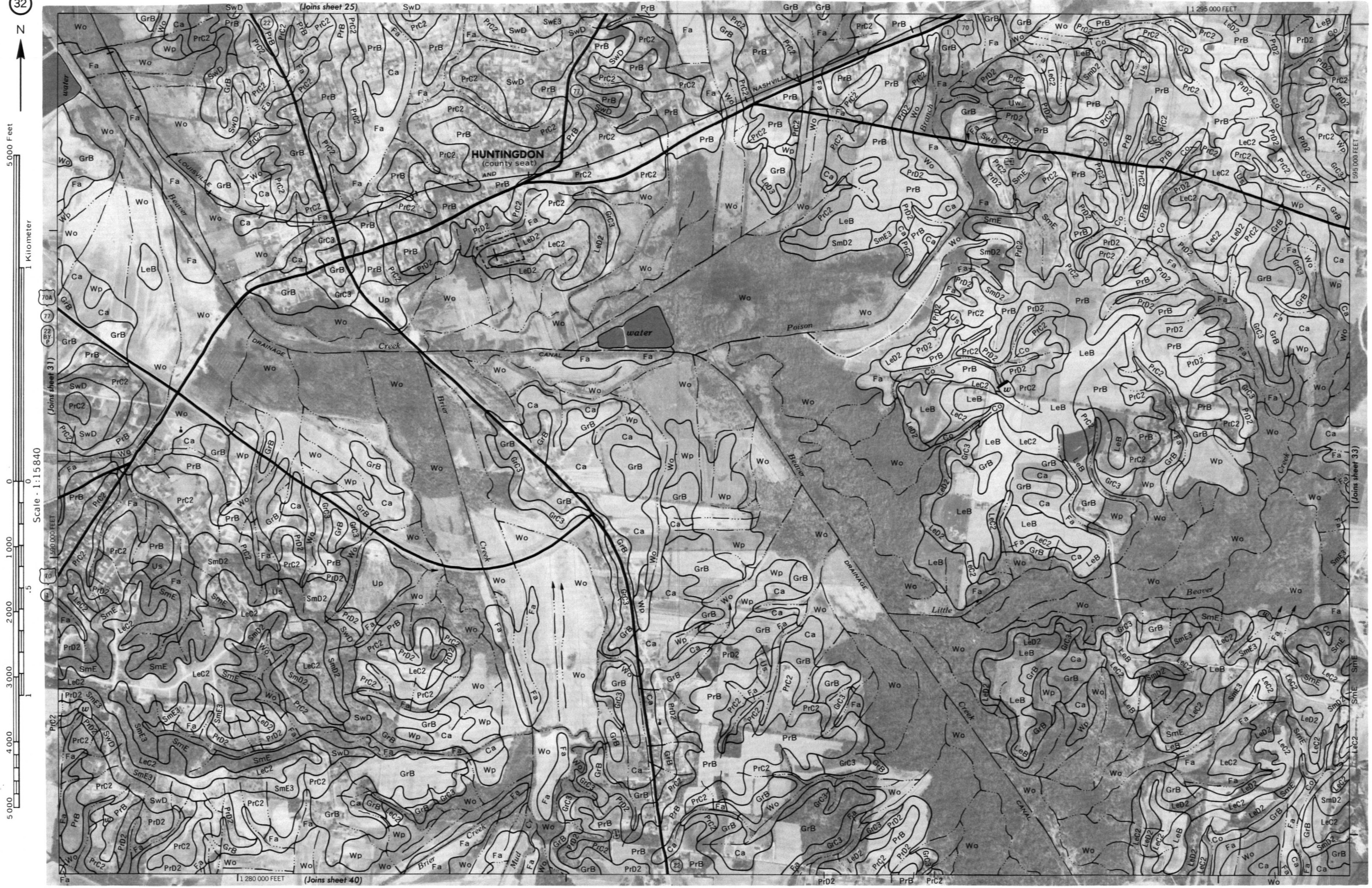
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 31

CARROLL COUNTY, TENNESSEE NO. 31

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 32



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 32

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 33

33

N

Scale 1:15840

1 Kilometer

5000 Feet

0 .5 1

0 1000 2000 3000 4000 5000

CARROLL COUNTY, TENNESSEE NO. 33

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

34

N

5 000 Feet
1 Kilometer
Scale - 1:15840
0
1000
2000
3000
4000
5000
0
.5
1

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
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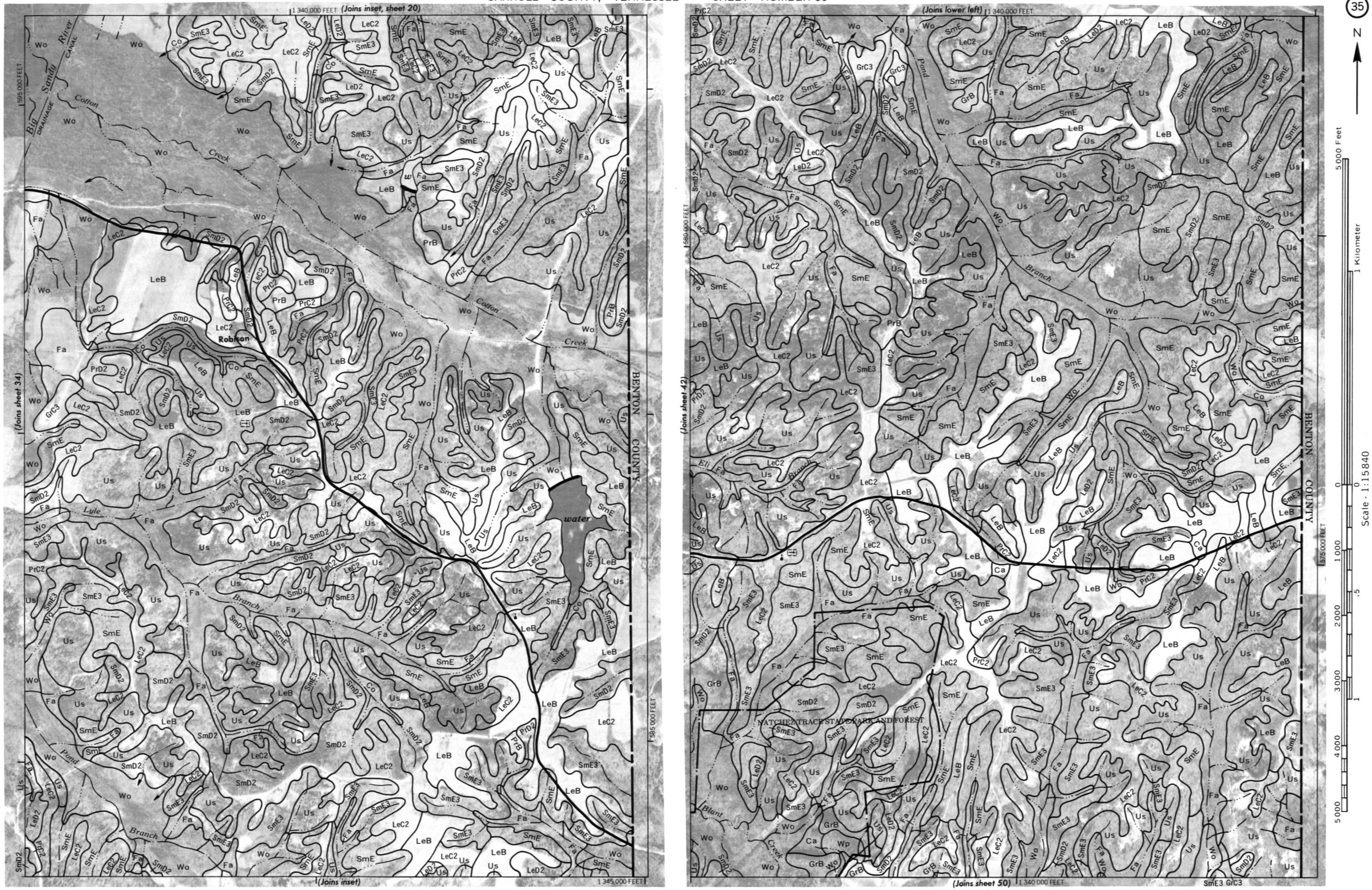
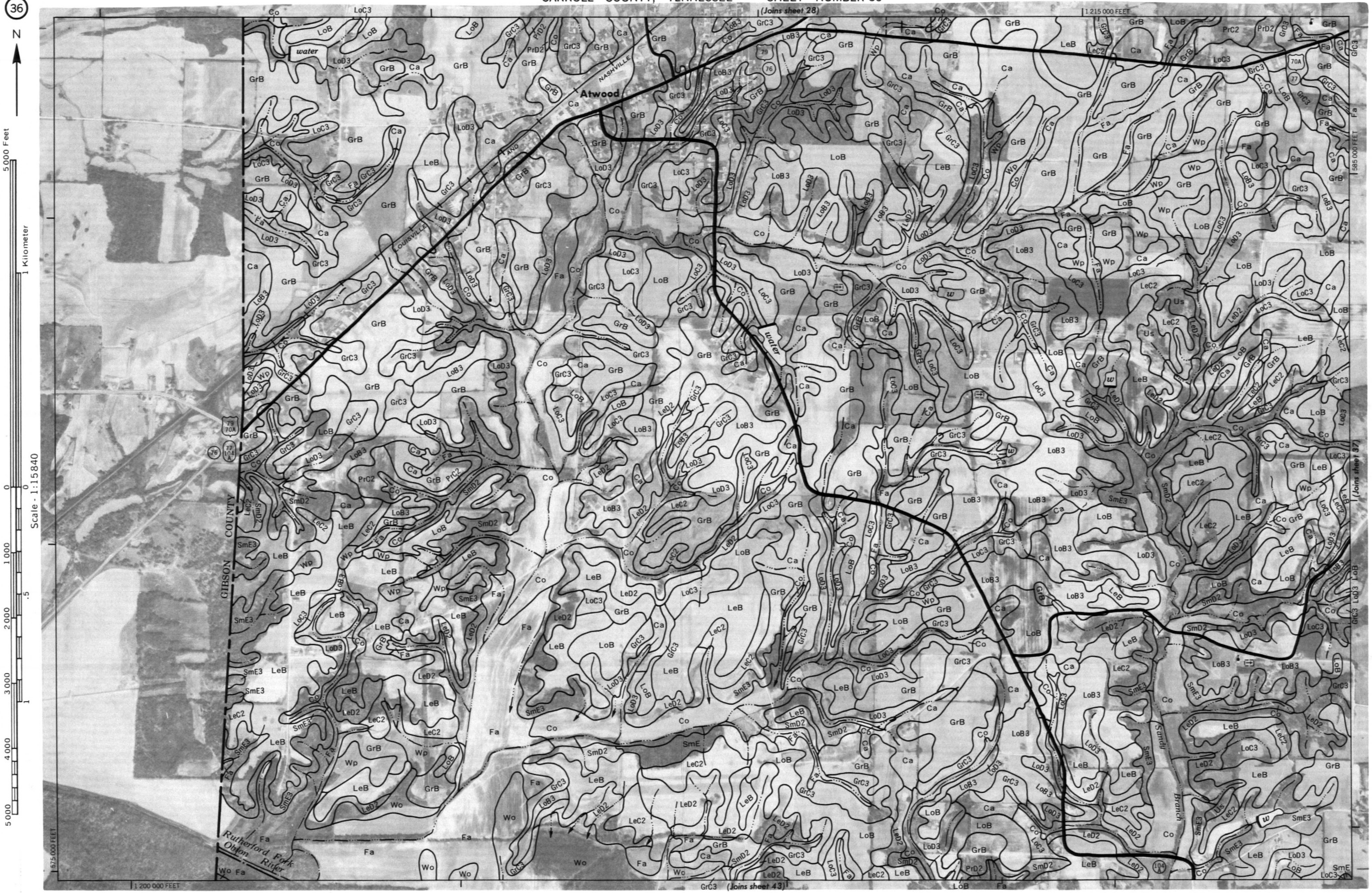


CARROLL COUNTY, TENNESSEE NO. 35

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

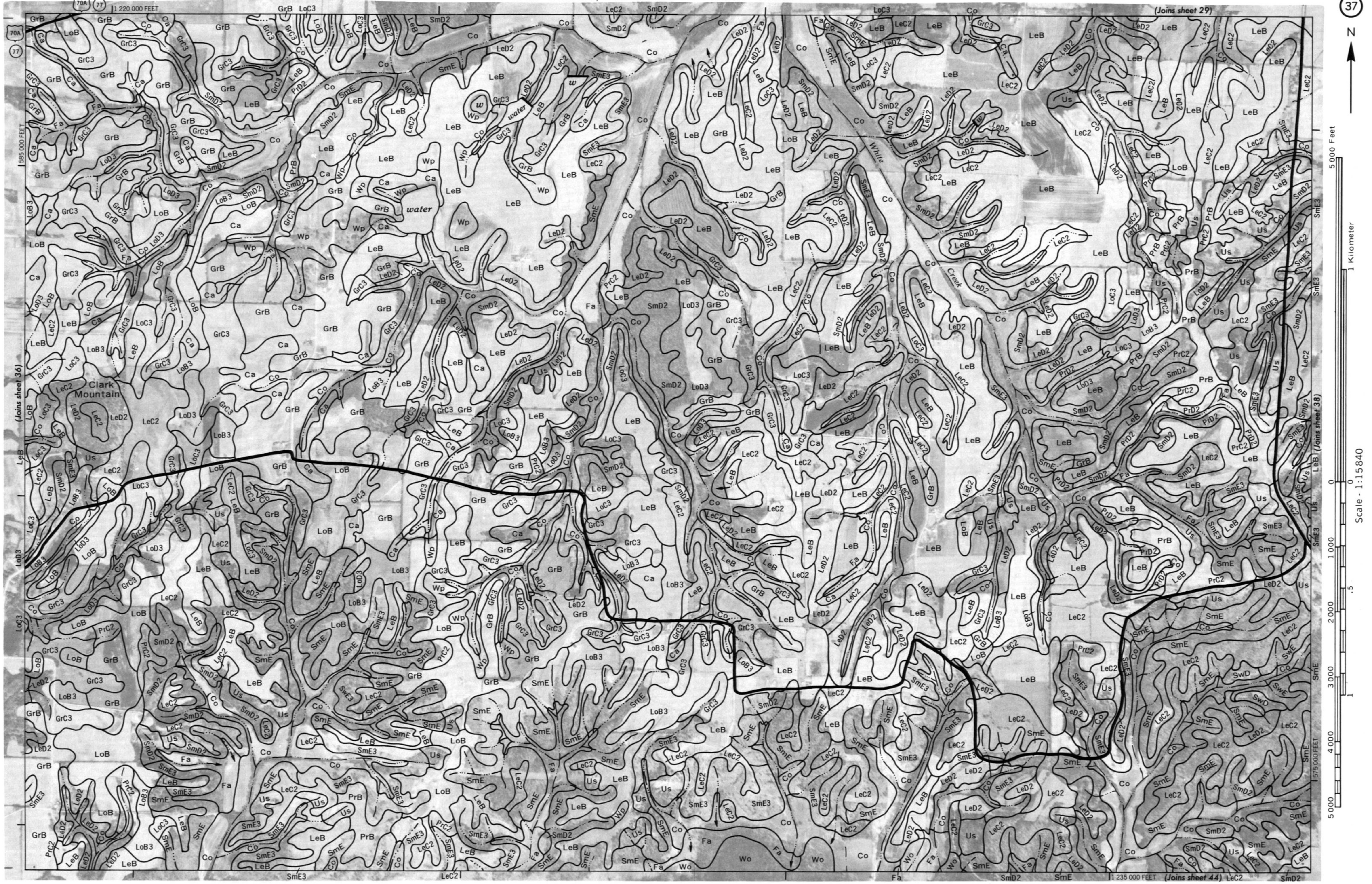
CARROLL COUNTY, TENNESSEE — SHEET NUMBER 36



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

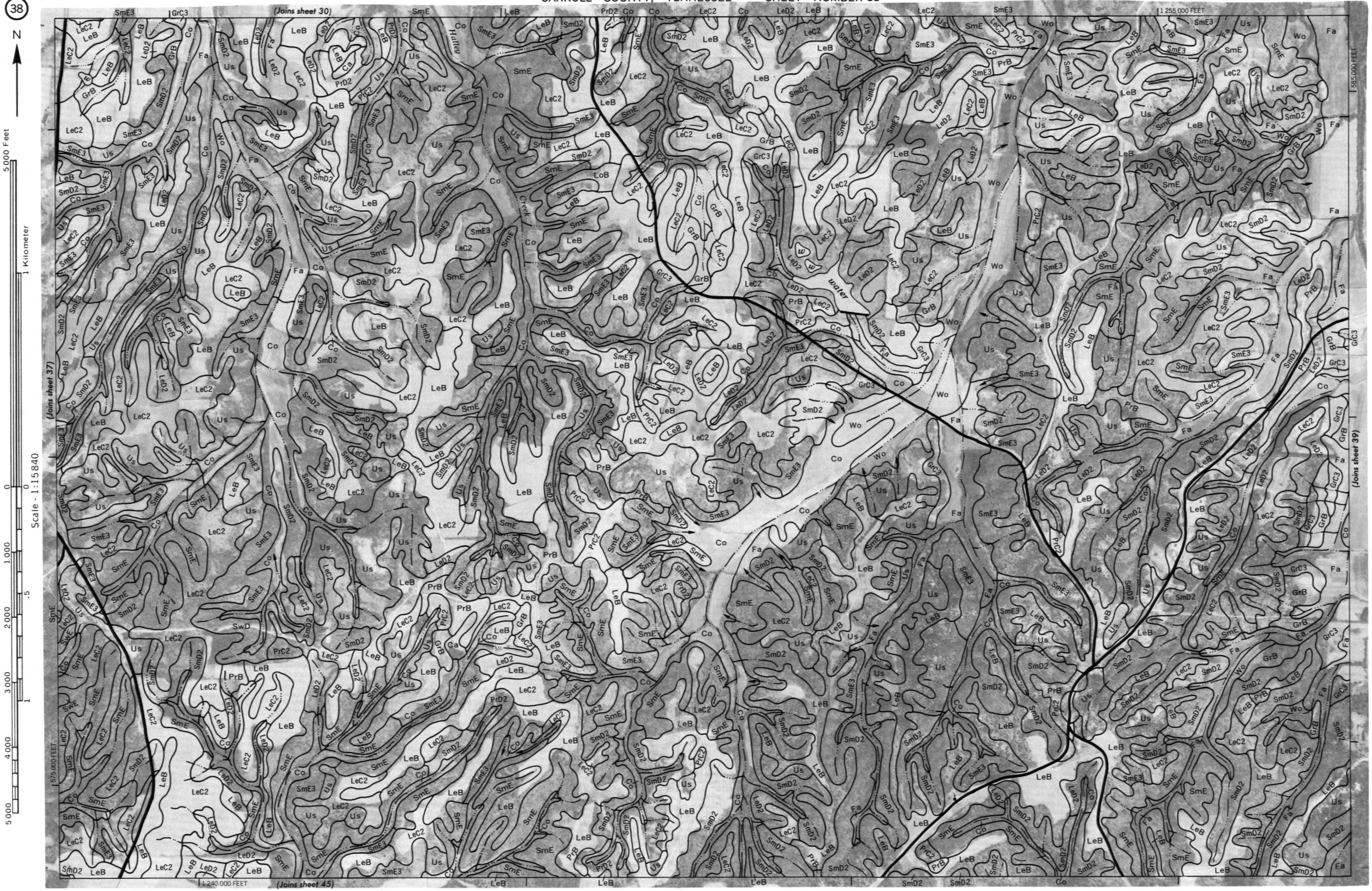
CARROLL COUNTY, TENNESSEE NO. 36

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 37



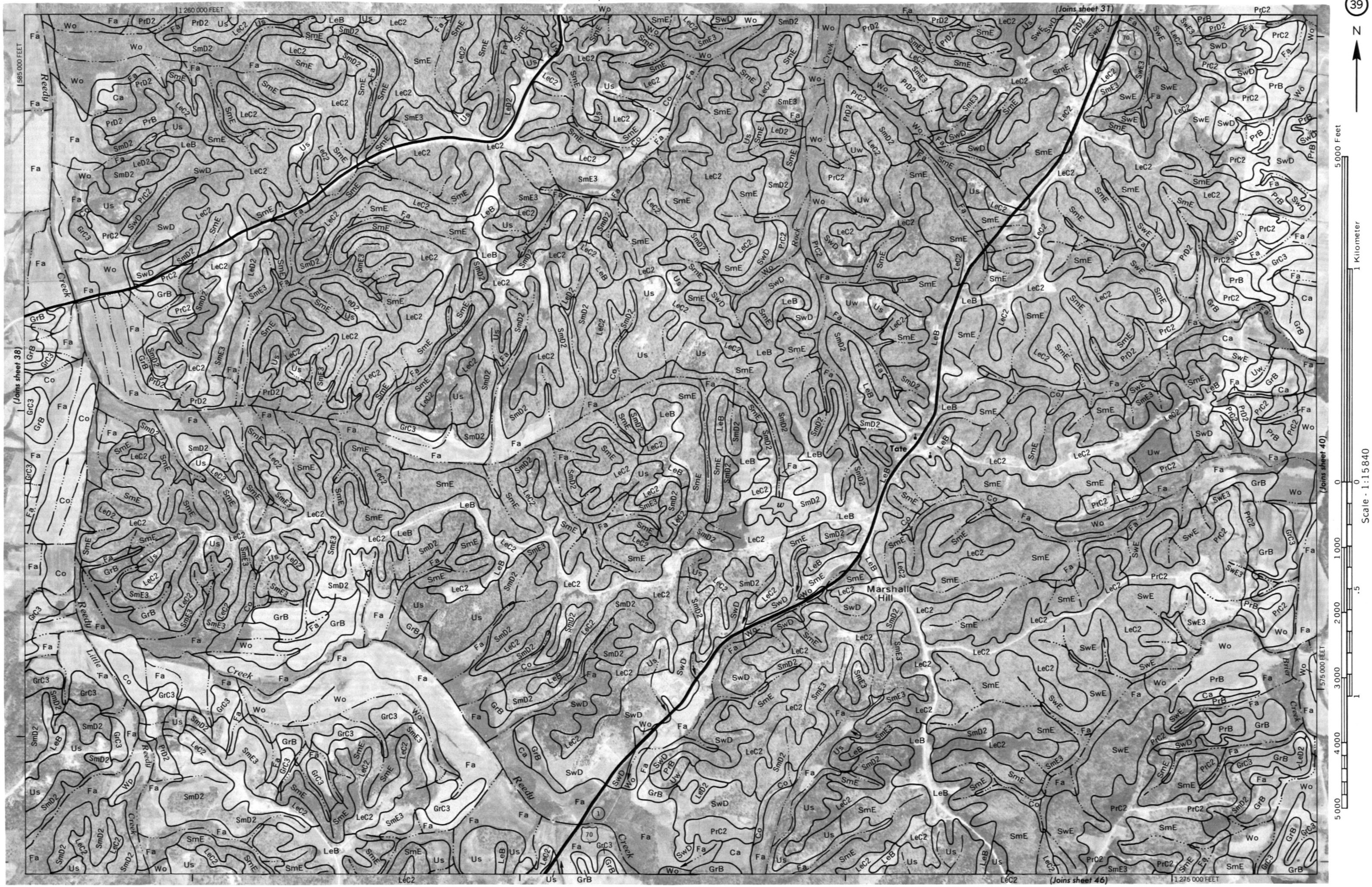
CARROLL COUNTY, TENNESSEE NO. 37

This map is compiled on 1978 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

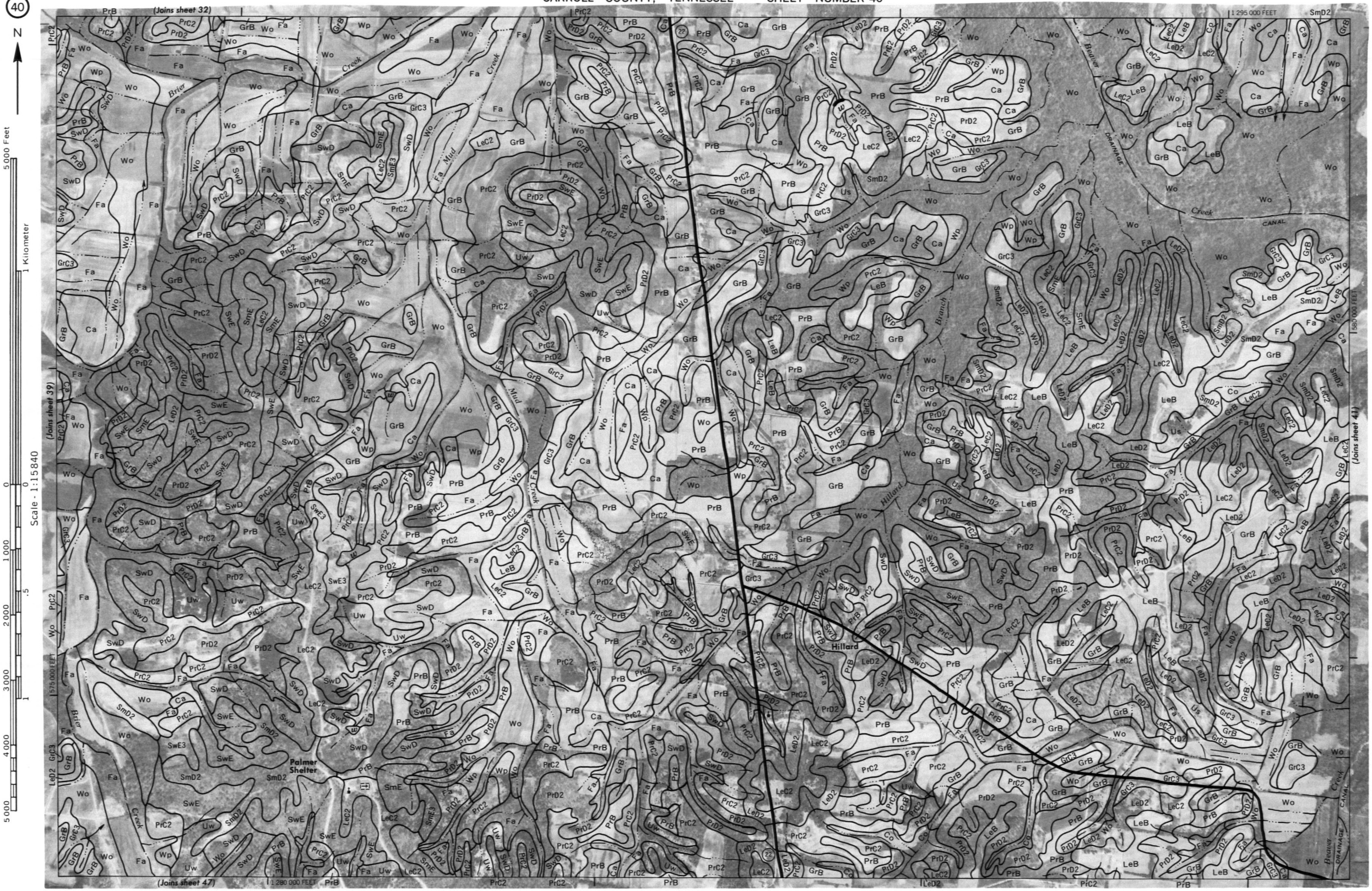
39



CARROLL COUNTY, TENNESSEE NO. 39

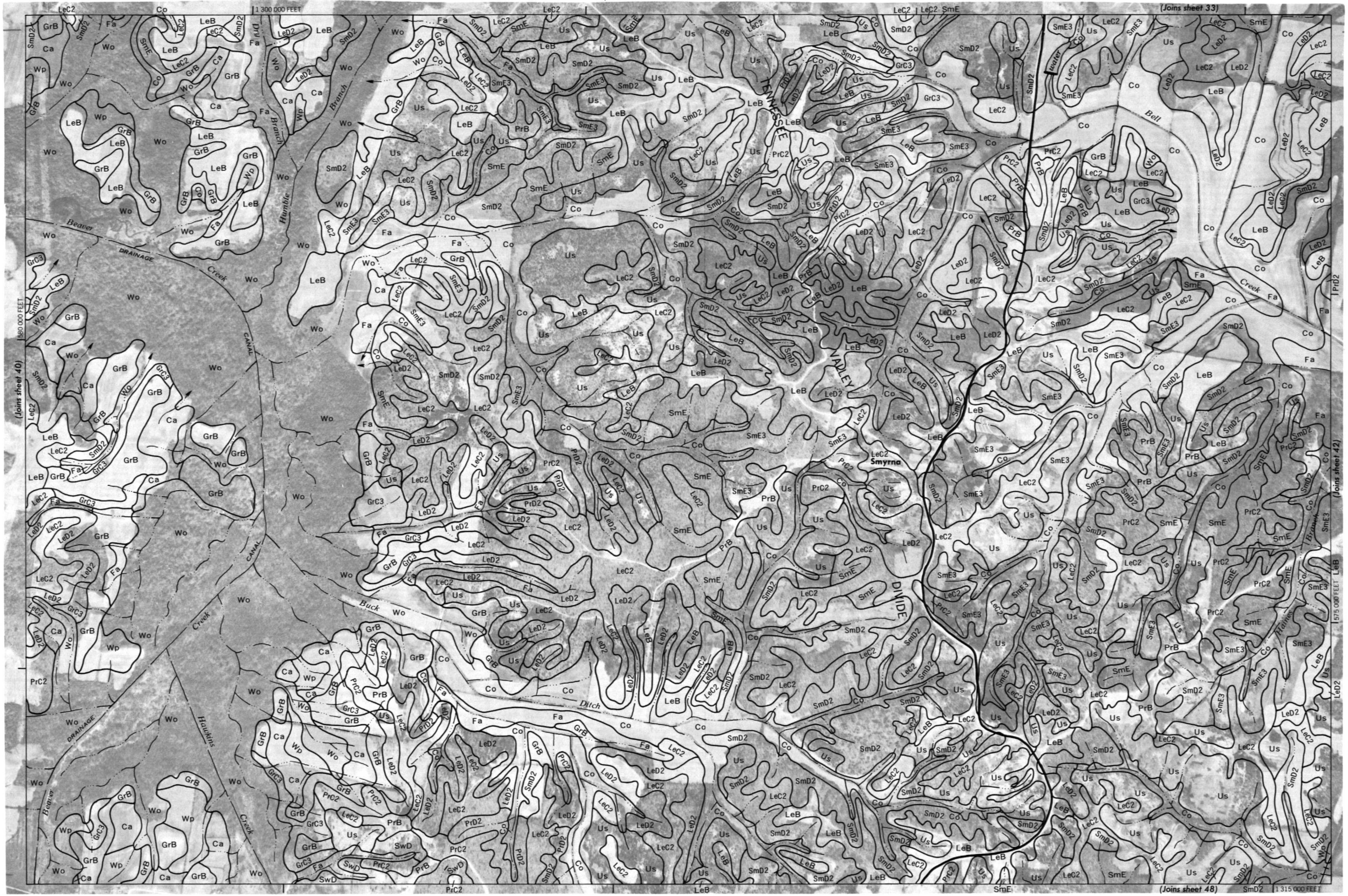
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 40



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 40

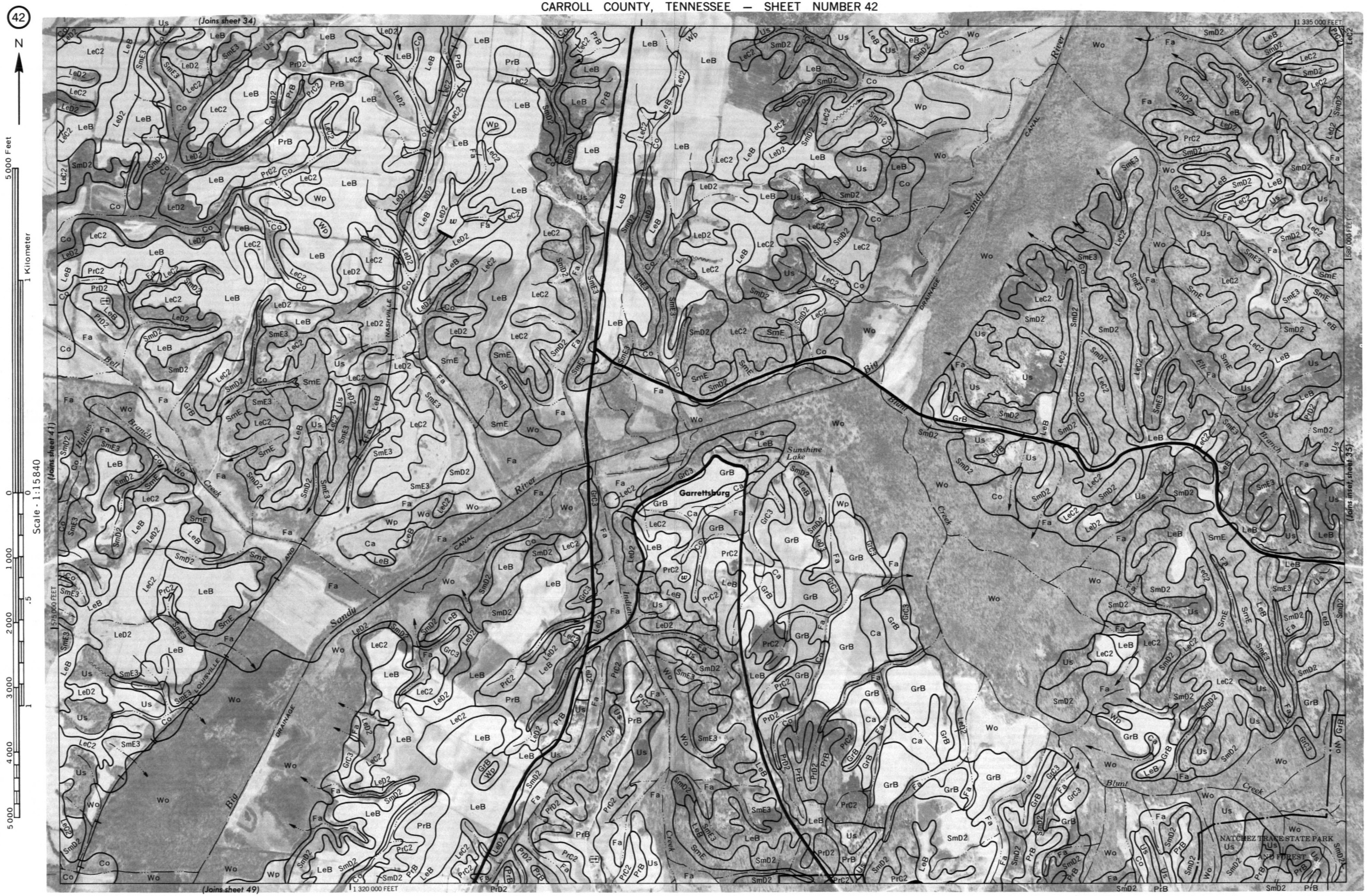


N

5 000 Feet
1 Kilometer
0
1000
2000
3000
4000
5 000
.5
1
Scale - 1:15 840

CARROLL COUNTY, TENNESSEE NO. 41

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 42

N

Scale - 1:15840

5 000 Feet

1 Kilometer

CARROLL COUNTY, TENNESSEE NO. 43

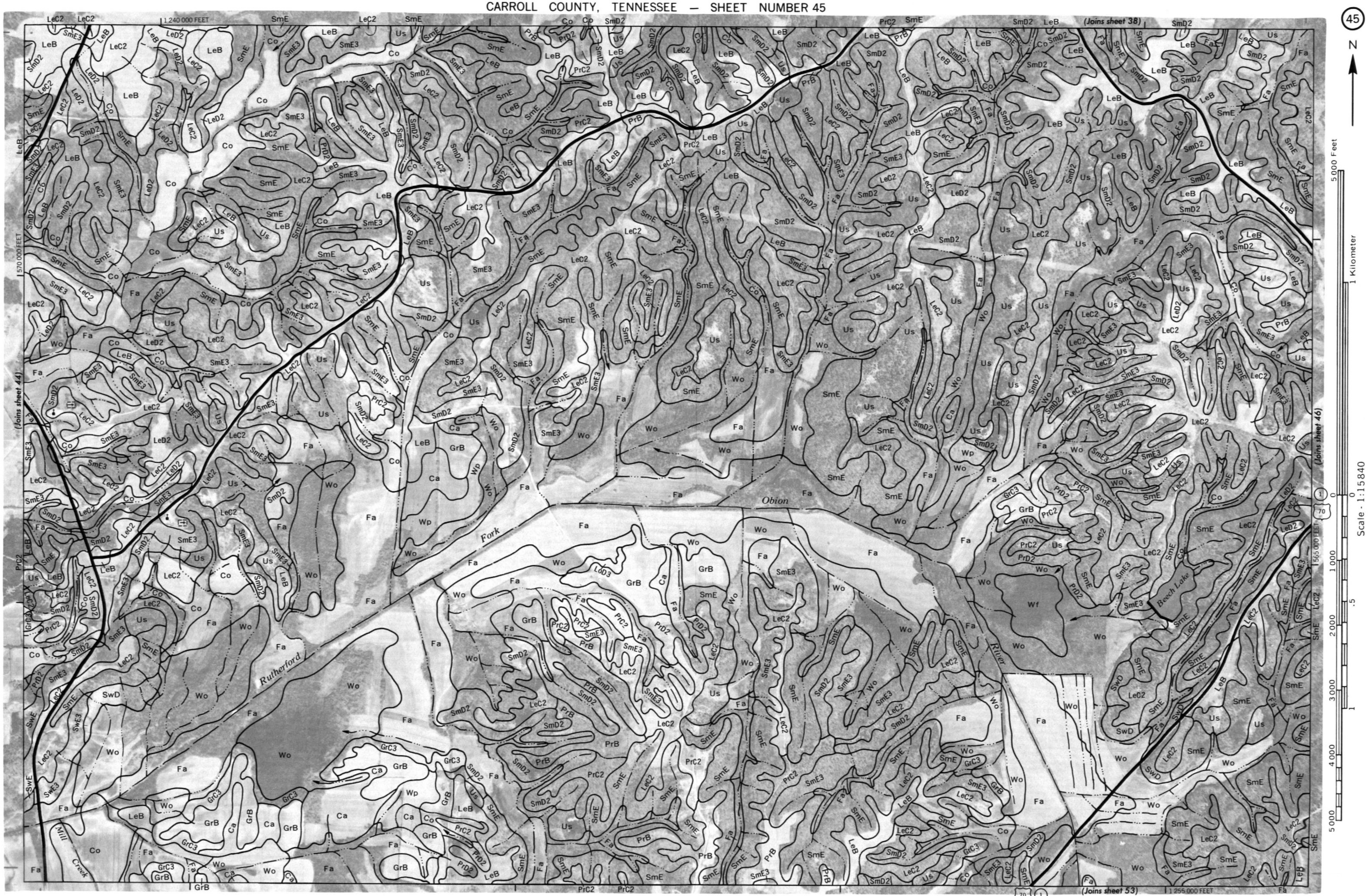
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 44

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 44

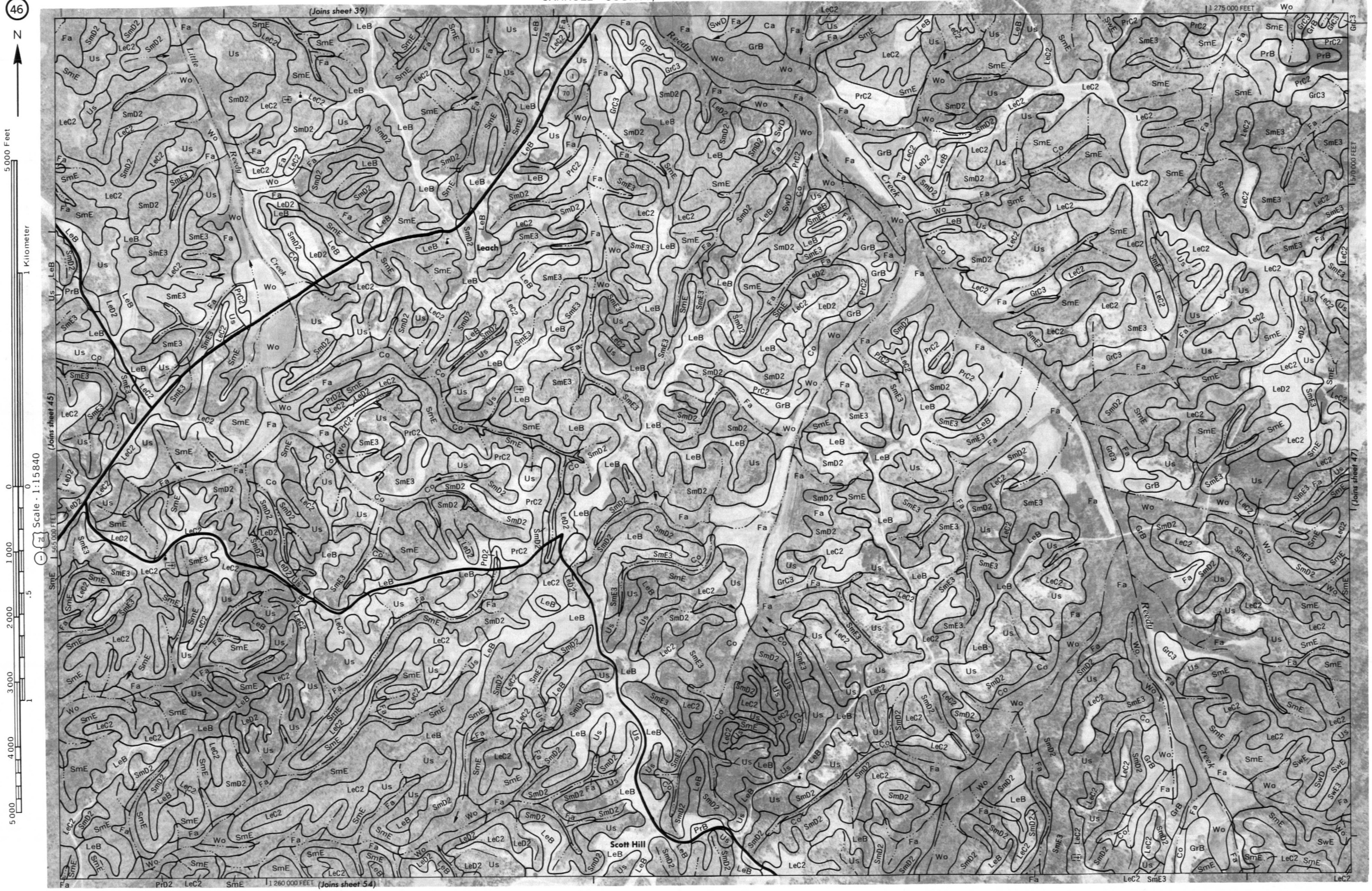
CARROLL COUNTY, TENNESSEE — SHEET NUMBER 45



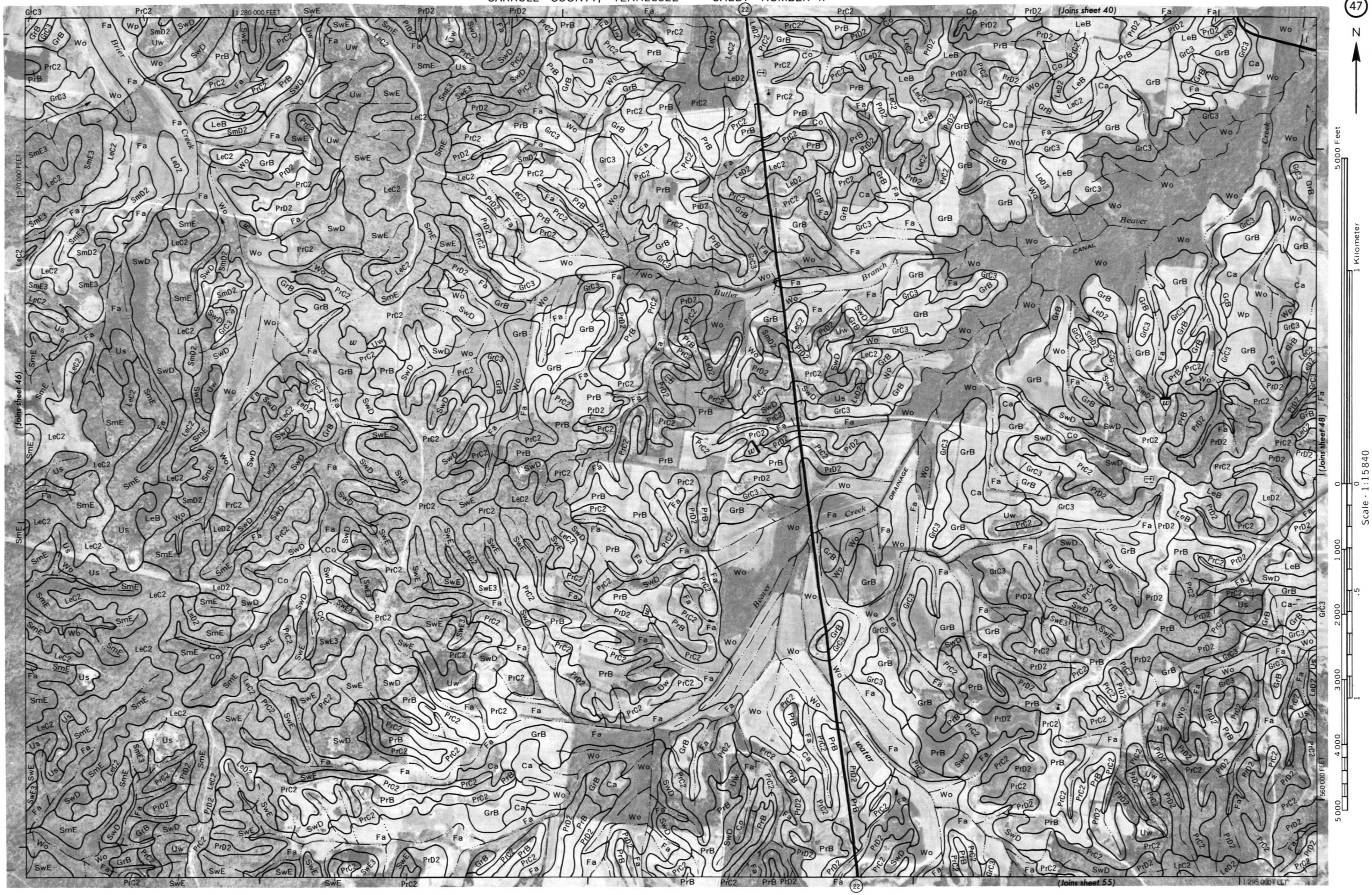
CARROLL COUNTY, TENNESSEE NO. 45

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 46



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

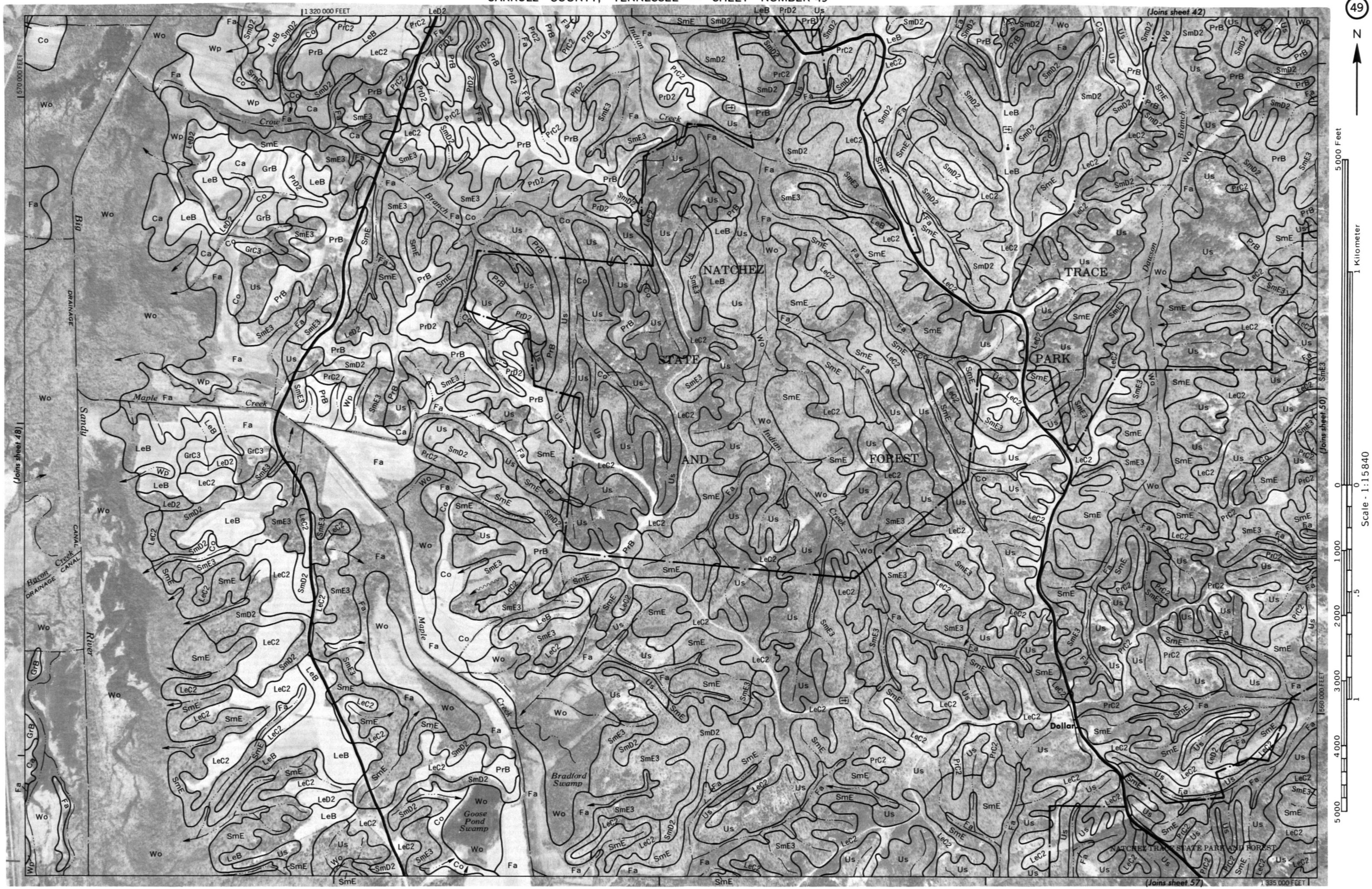


CARROLL COUNTY, TENNESSEE NO. 47

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 48

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



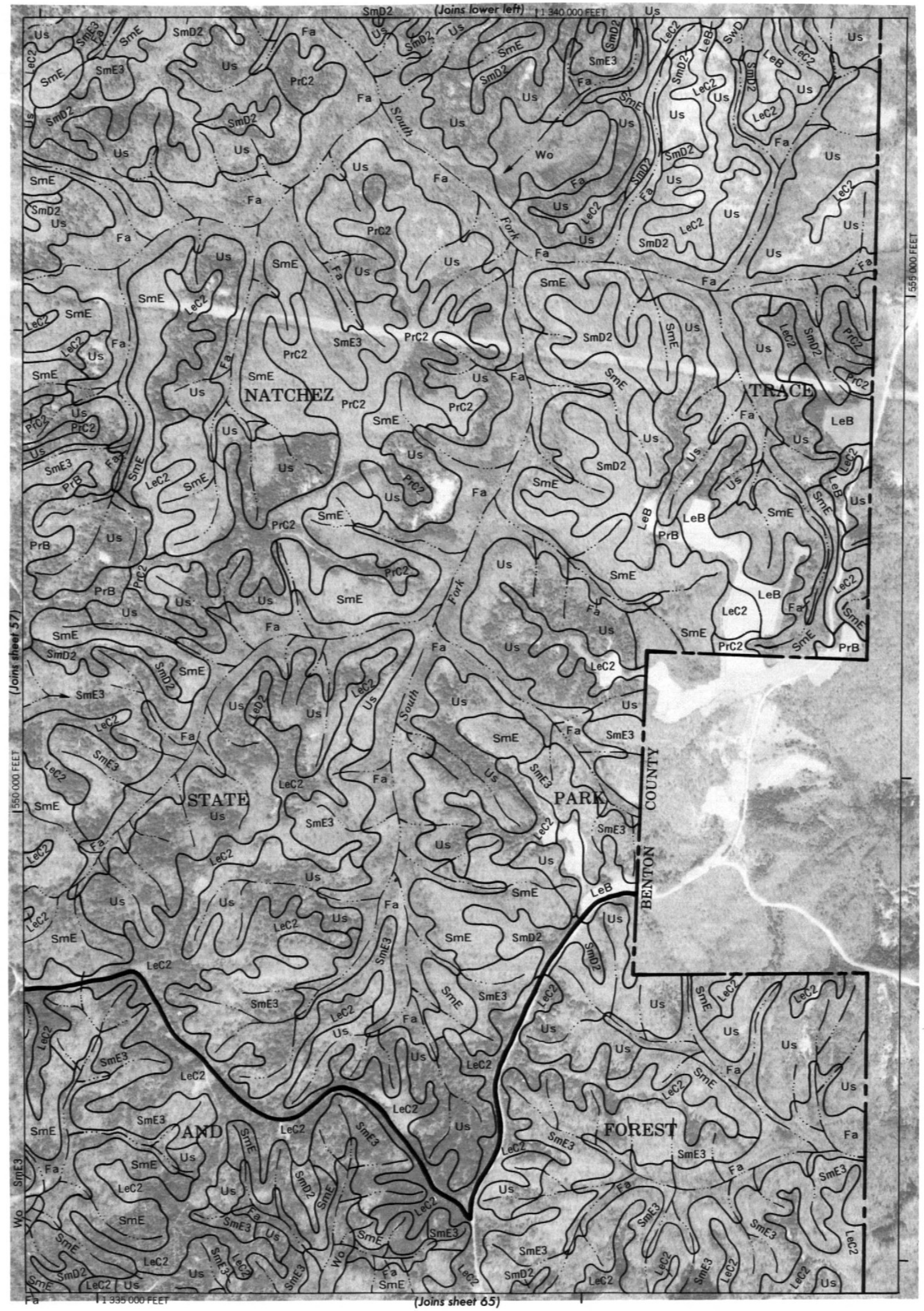
CARROLL COUNTY, TENNESSEE NO. 49
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

N

Scale - 1:15840

5000 Feet

1 Kilometer



4000 AND 5000-FOOT GRID TICKS

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(51)

CARROLL COUNTY, TENNESSEE NO. 51

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 52

N

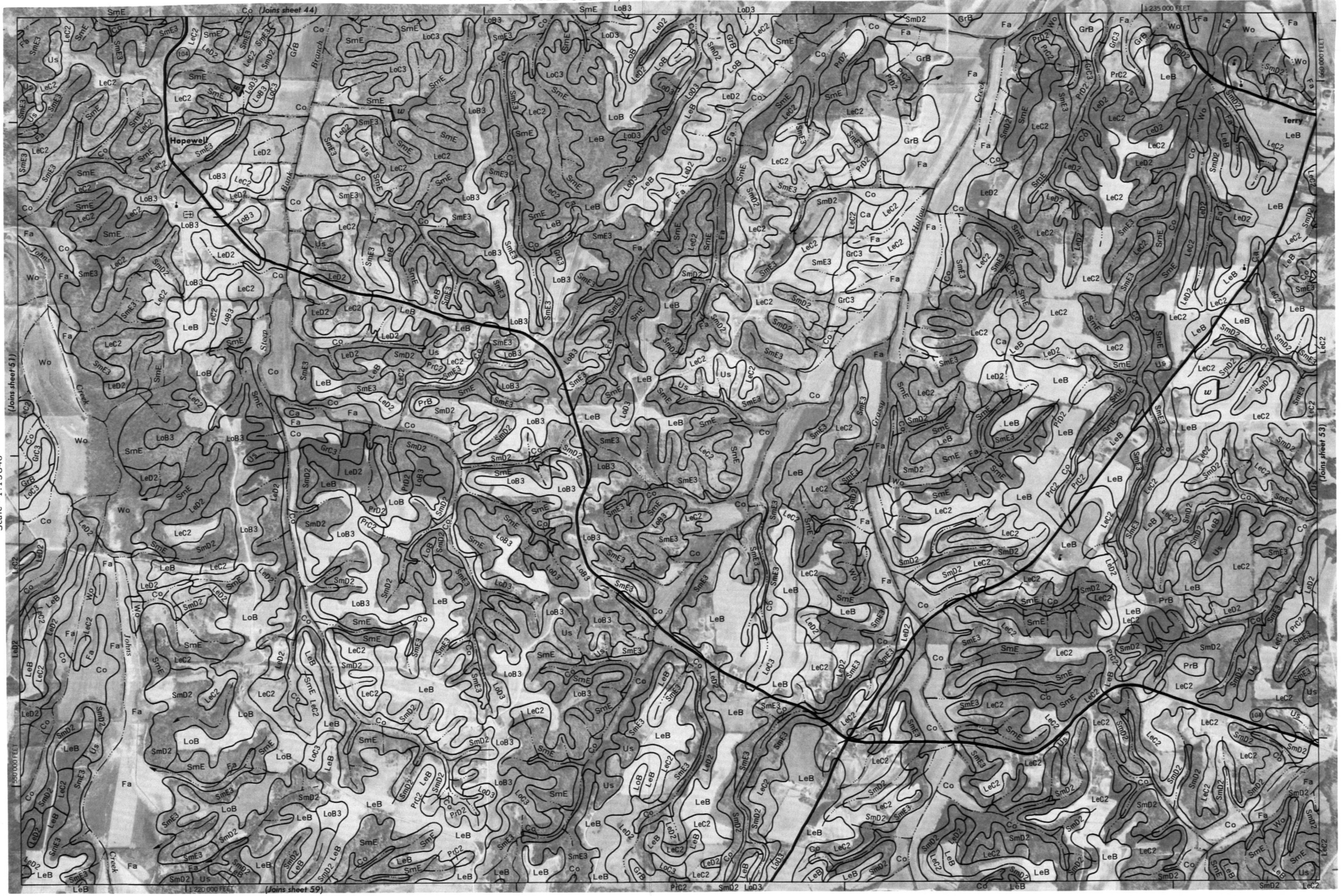
5 000 Feet

1 Kilometer

Scale - 1:15840

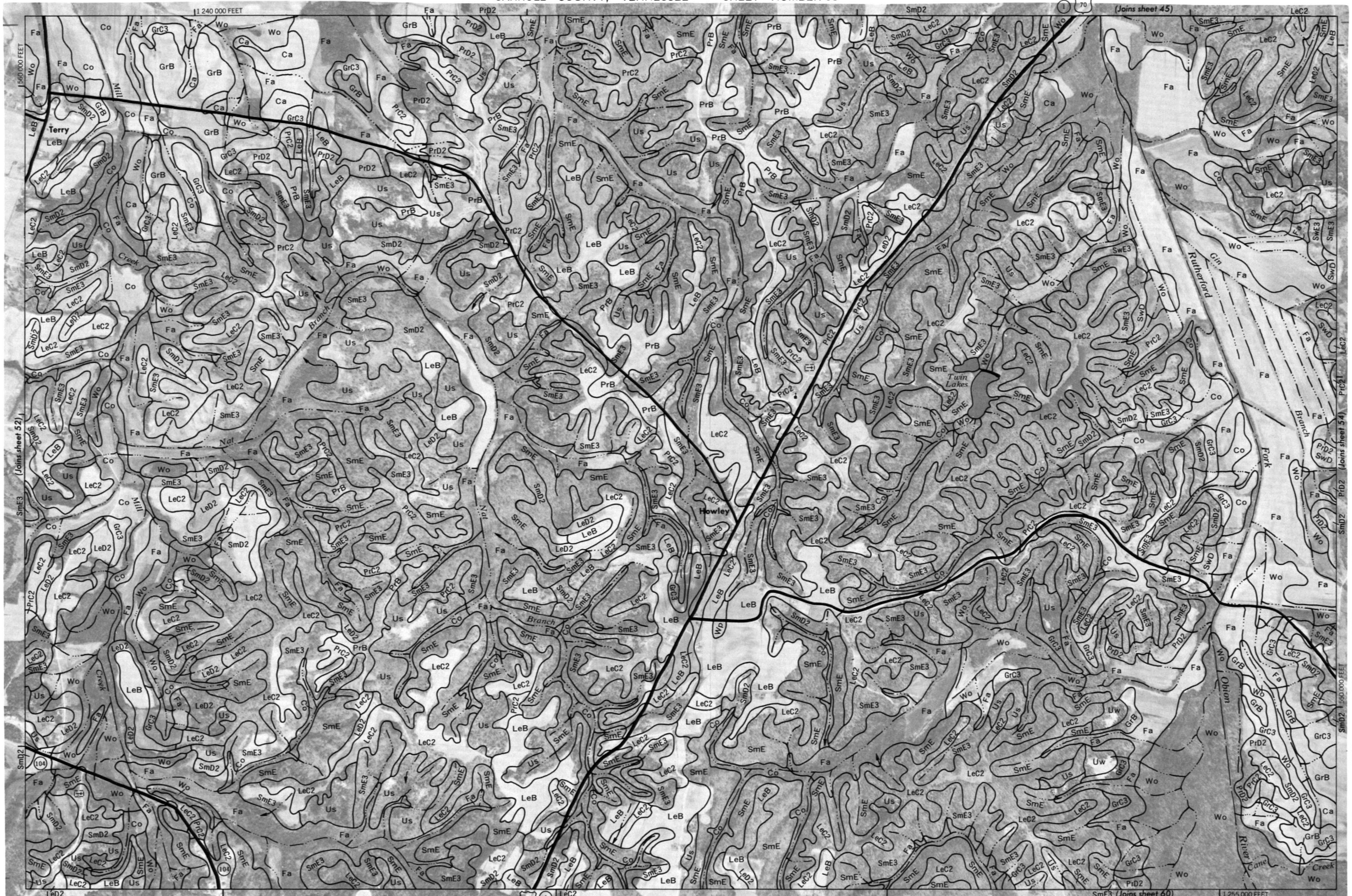
0 1 000 2000 3000 4000 5000

0 .5 1



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

53



N

5 000 Feet

1 Kilometer

Scale 1:15840

CARROLL COUNTY, TENNESSEE NO. 53

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 54

N

Scale 1:15 840

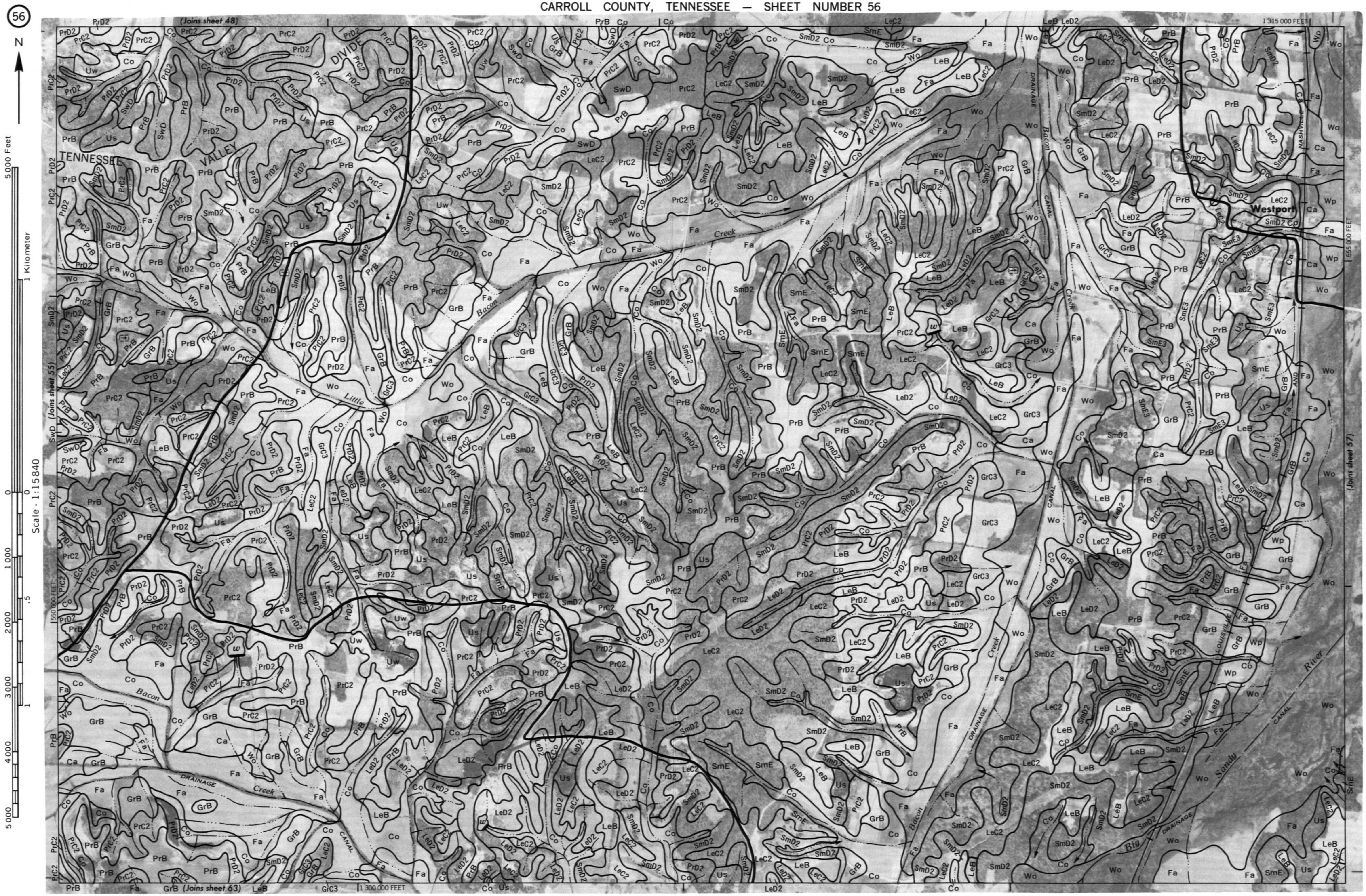
5000 Feet

1 Kilometer

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 55

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 57

CARROLL COUNTY, TENNESSEE NO. 57

This map is compiled on 1978 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

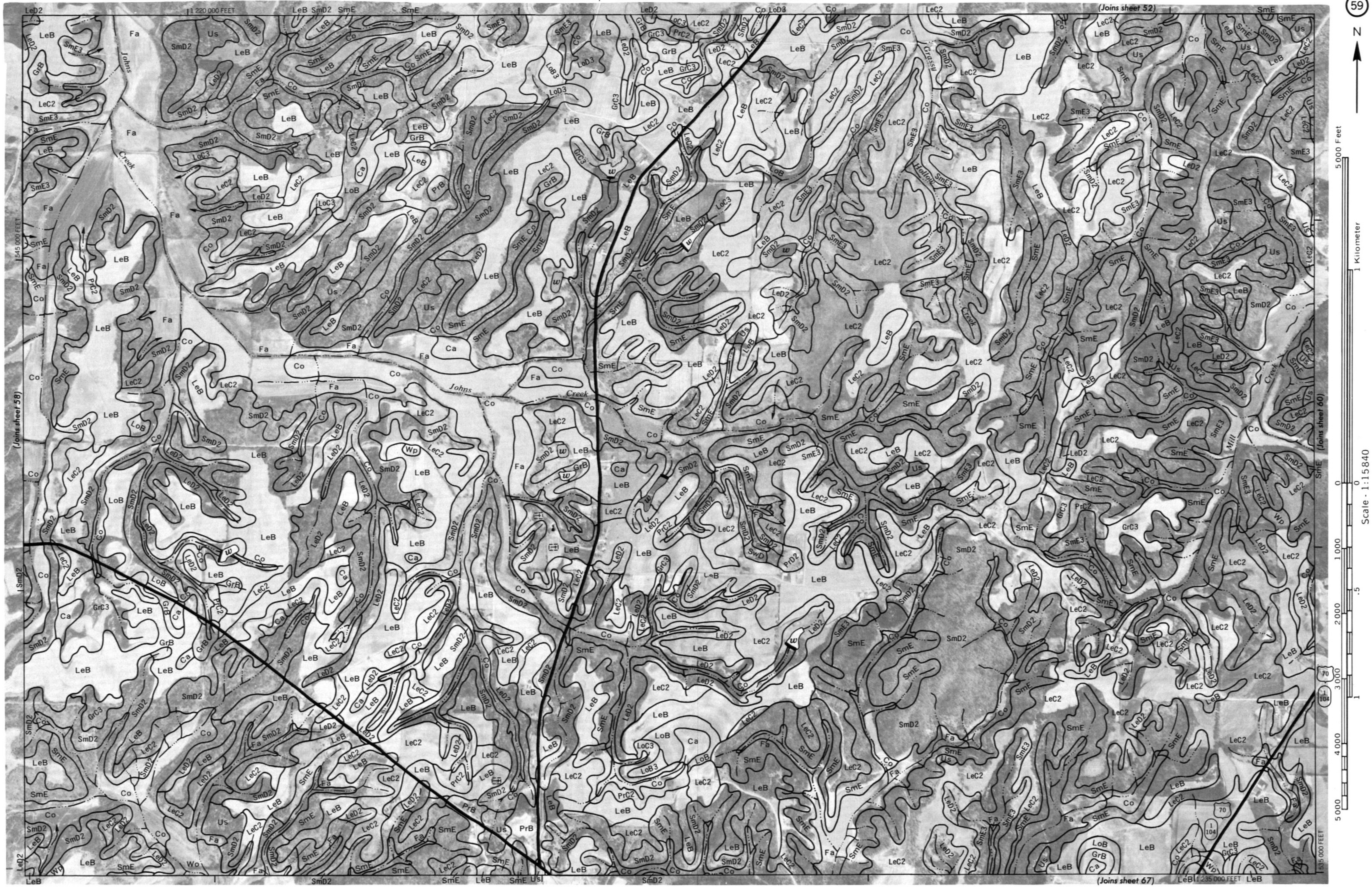
CARROLL COUNTY, TENNESSEE — SHEET NUMBER 58

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

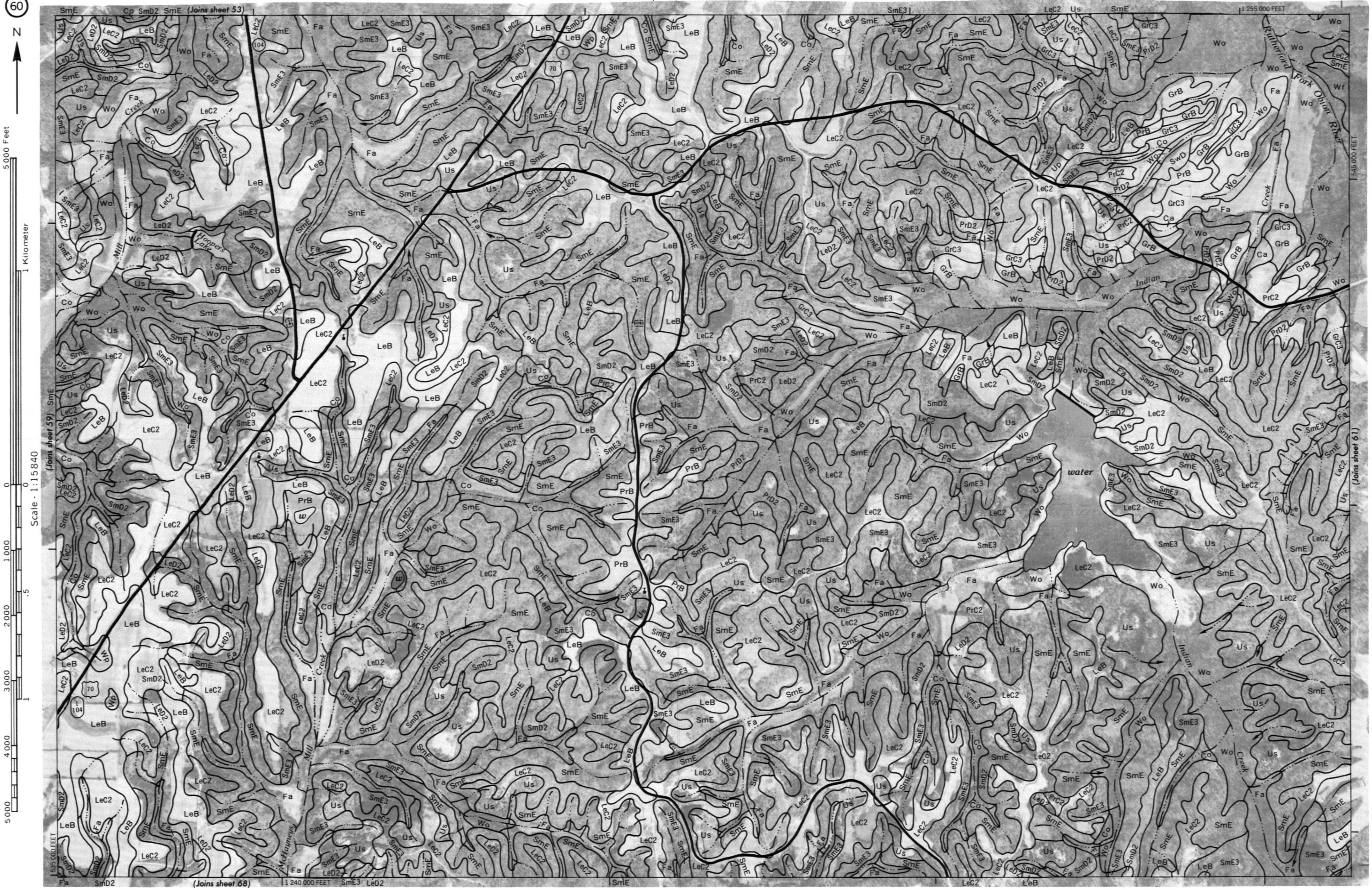
CARROLL COUNTY, TENNESSEE NO. 58

CARROLL COUNTY, TENNESSEE NO. 59

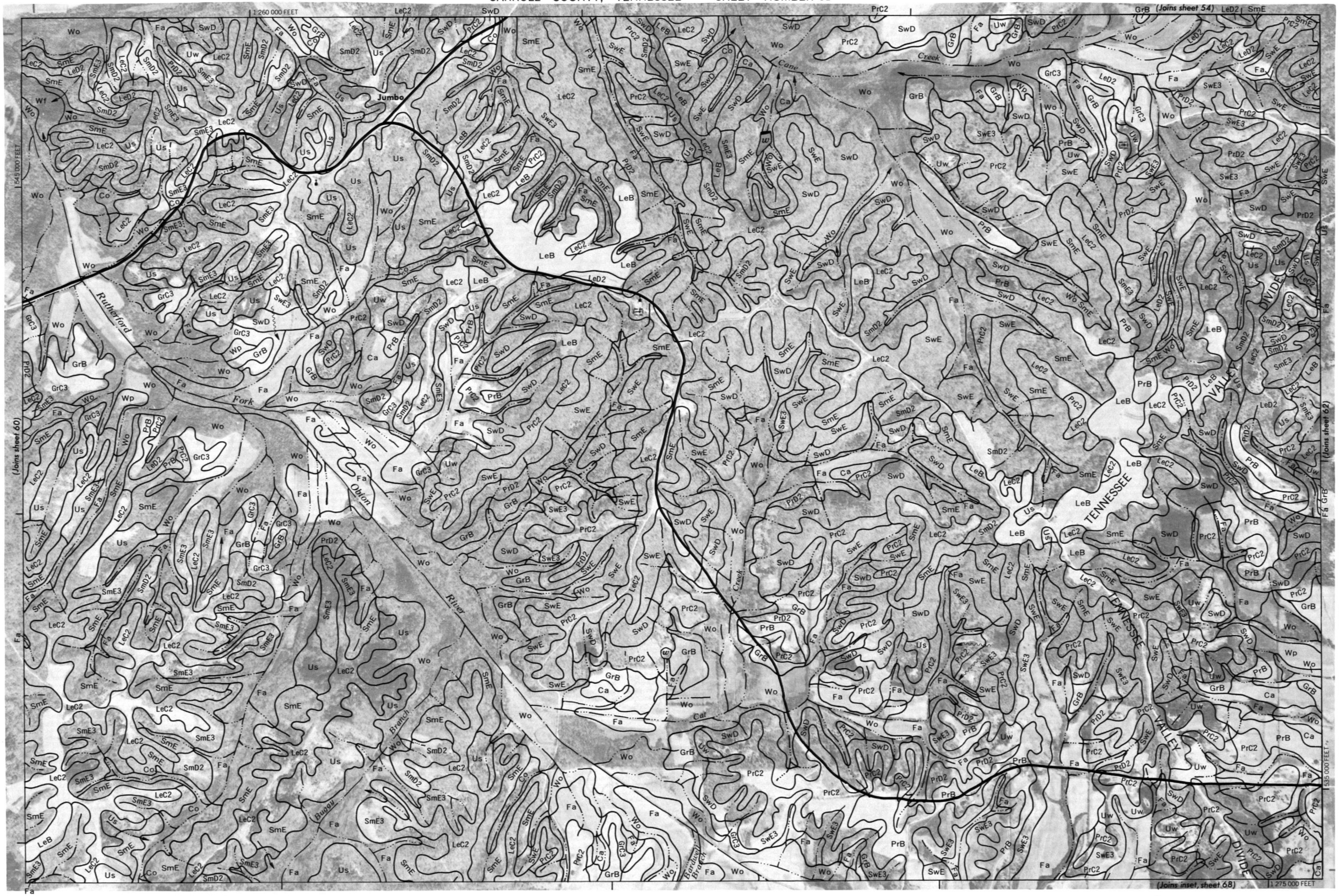
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CARROLL COUNTY, TENNESSEE — SHEET NUMBER 60



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



N

Scale - 1:15840

5000 Feet

1 Kilometer

0 1000 2000 3000 4000 5000

0 .5 1

CARROLL COUNTY, TENNESSEE NO. 61

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 62

62

N

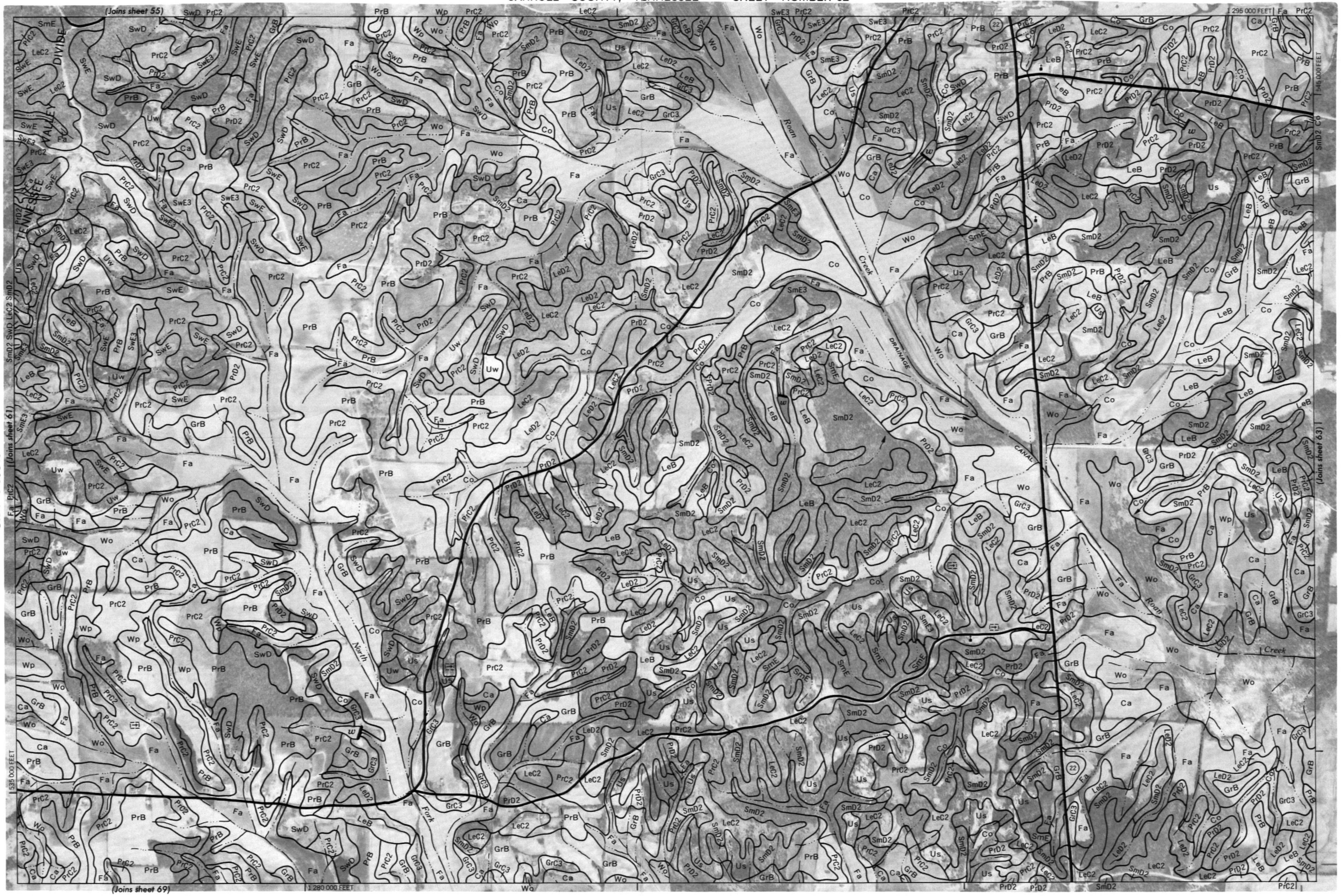
5000 Feet

1 Kilometer

Scale 1:15 840

0 1000 2000 3000 4000 5000

0 .5 1

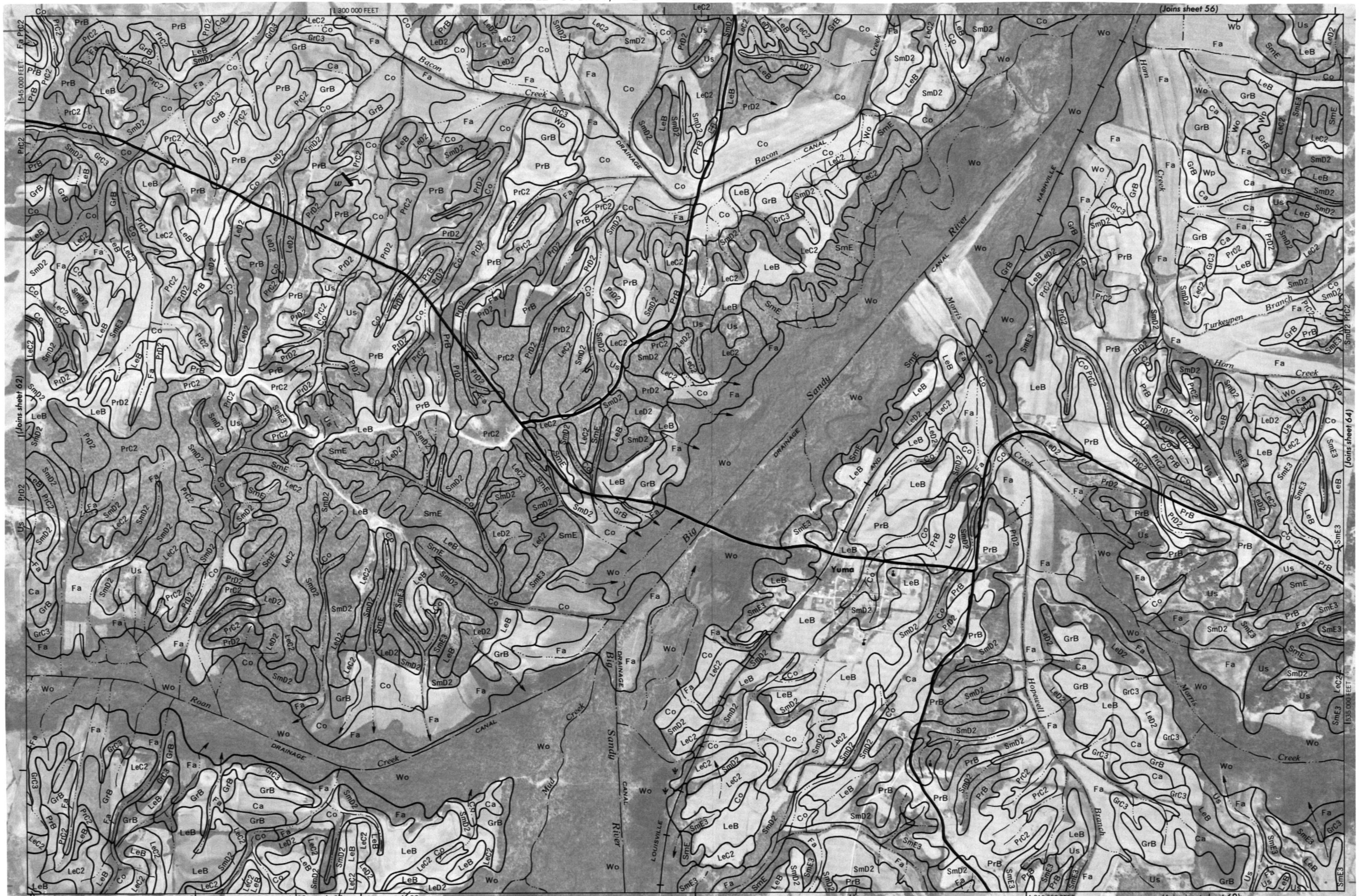


This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE NO. 62

CARROLL COUNTY, TENNESSEE NO. 63

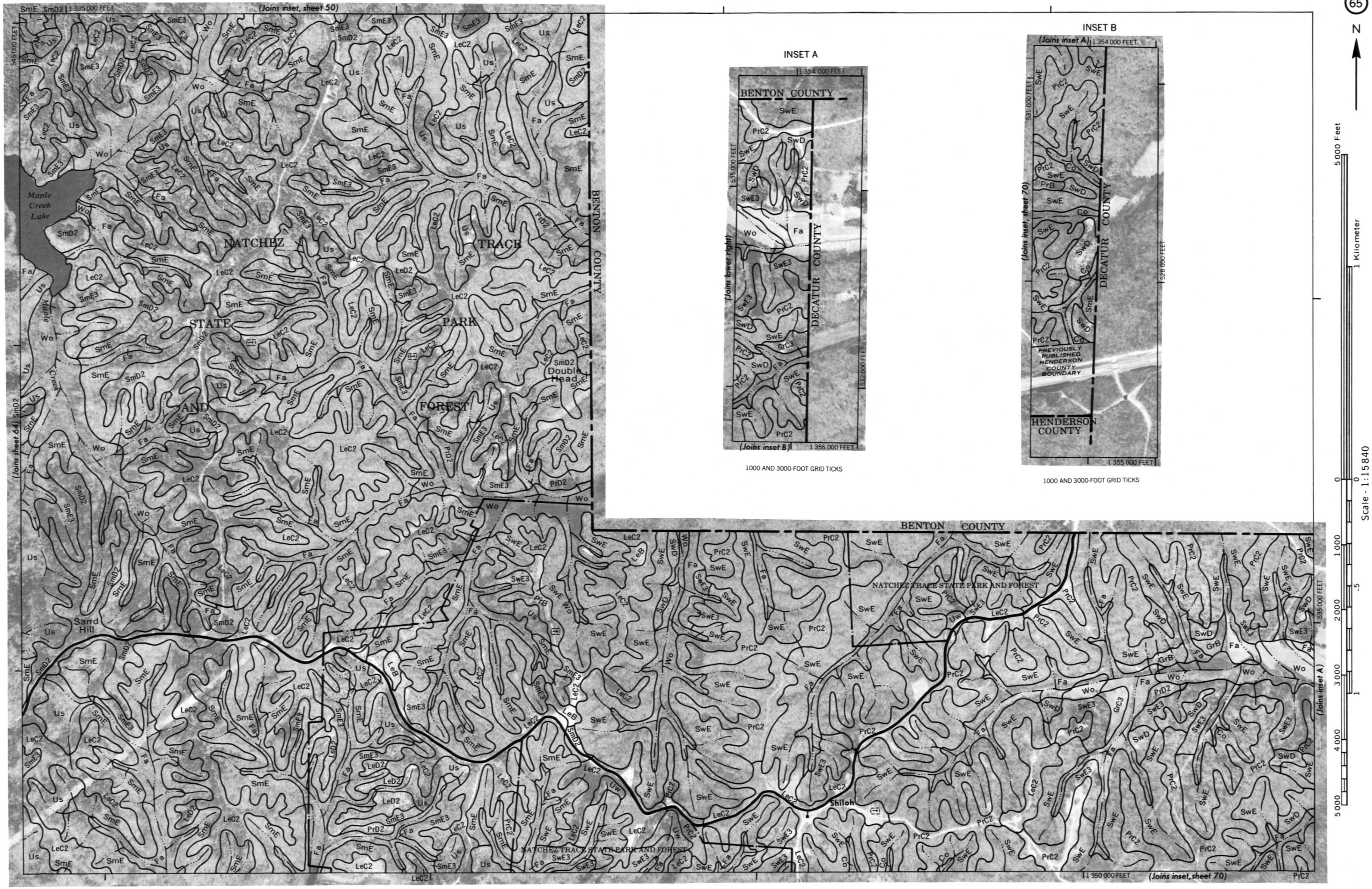
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



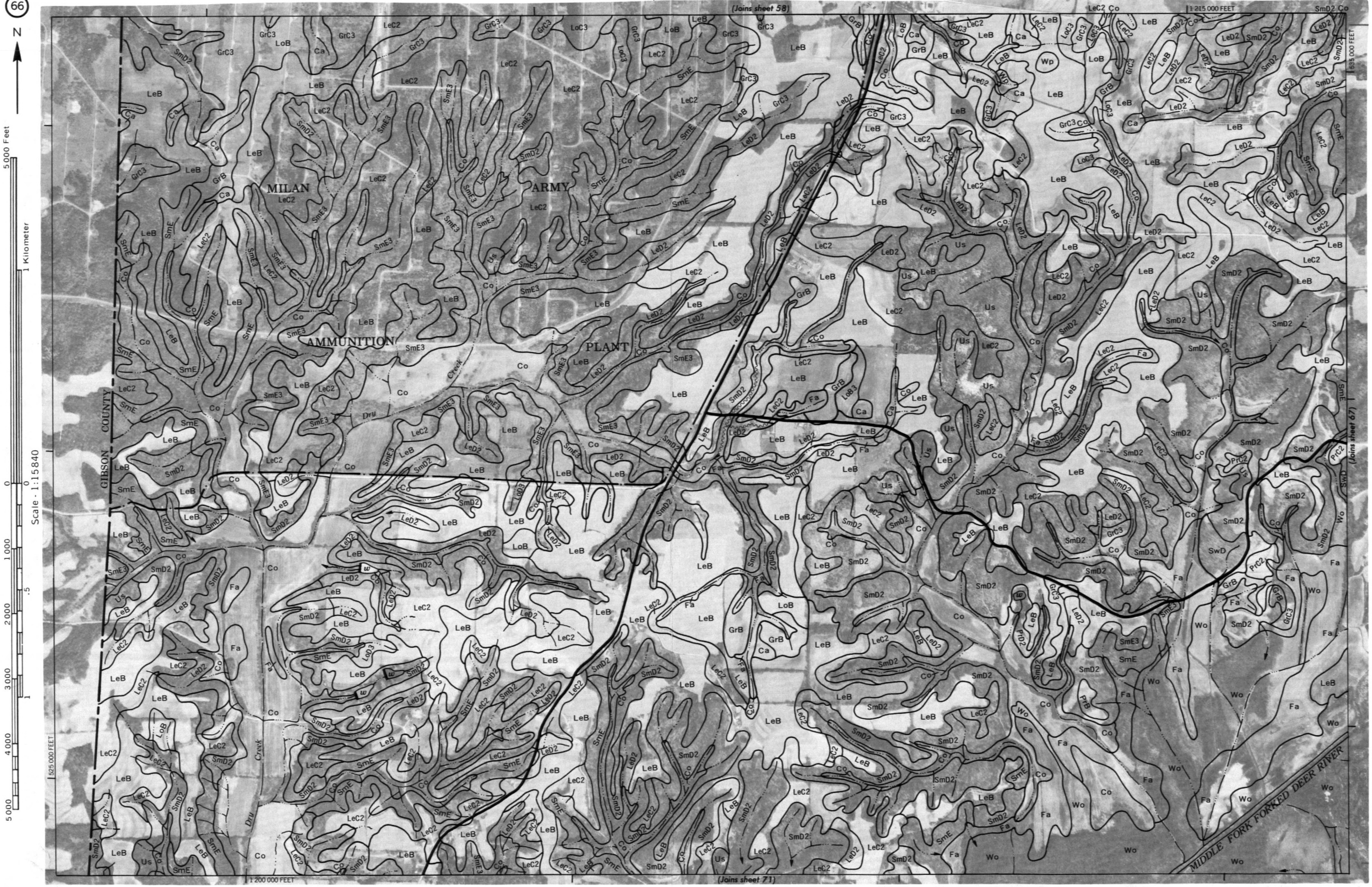
N

5000 Feet
1 Kilometer
Scale - 1:15 840

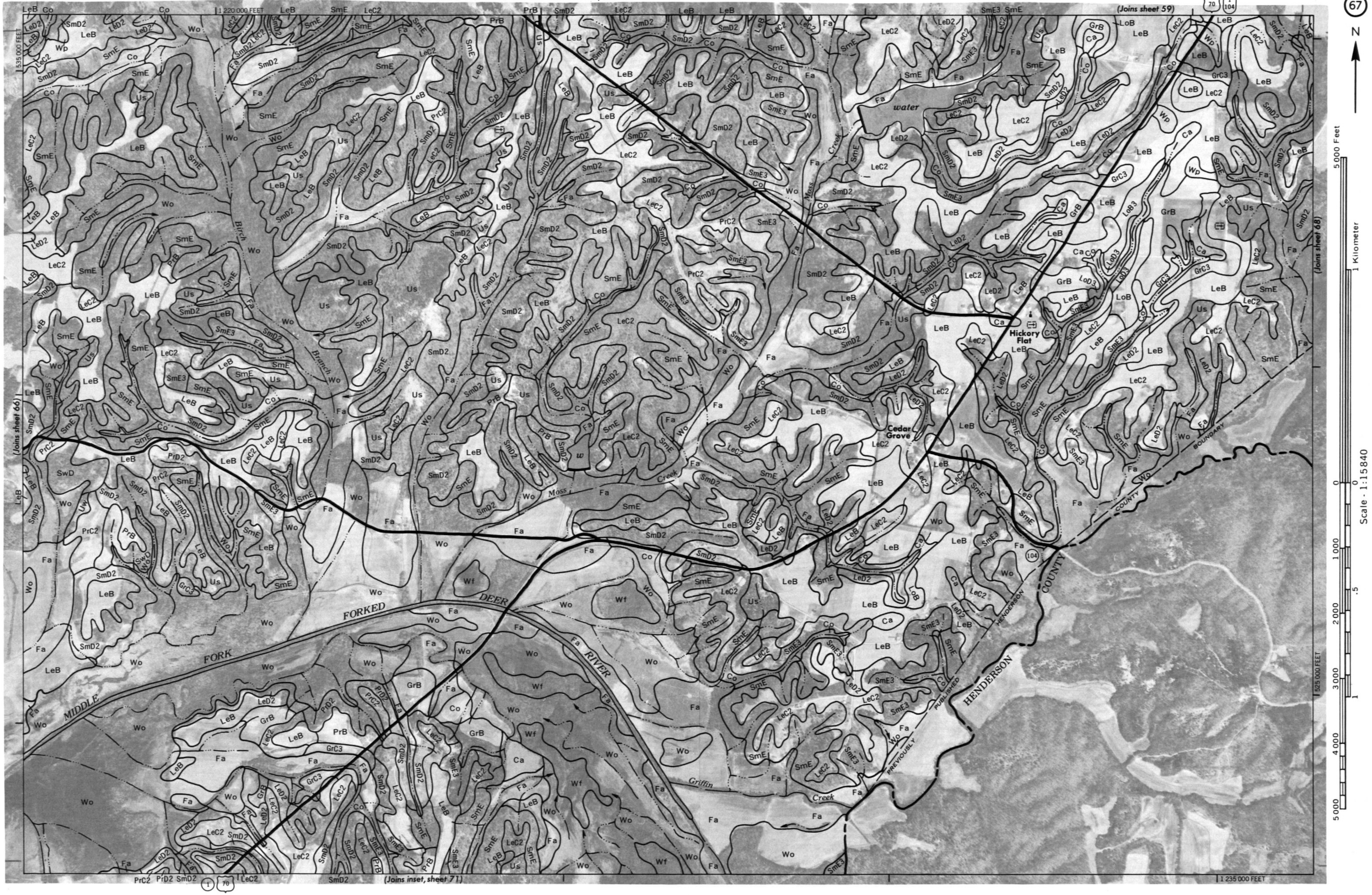
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



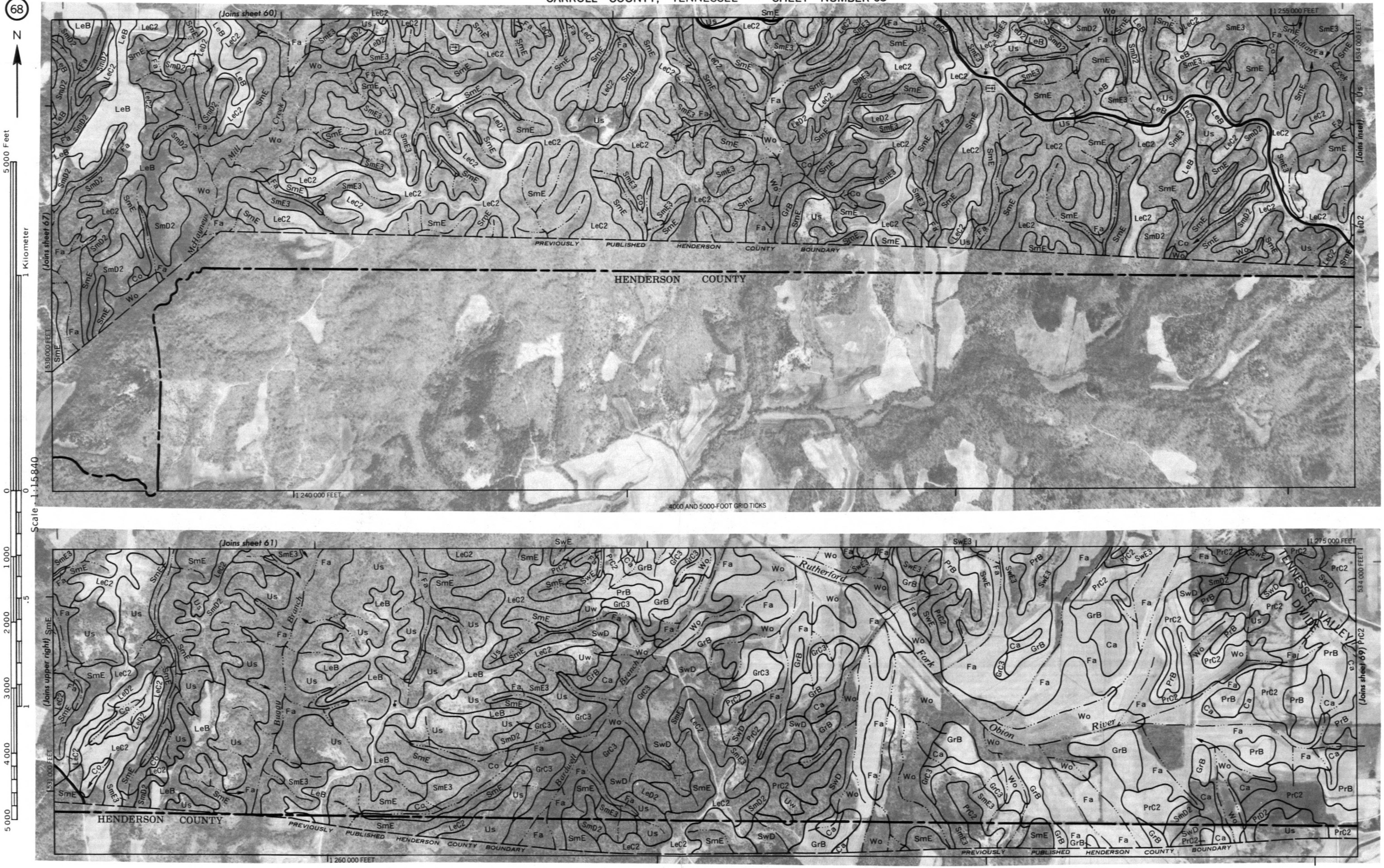
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



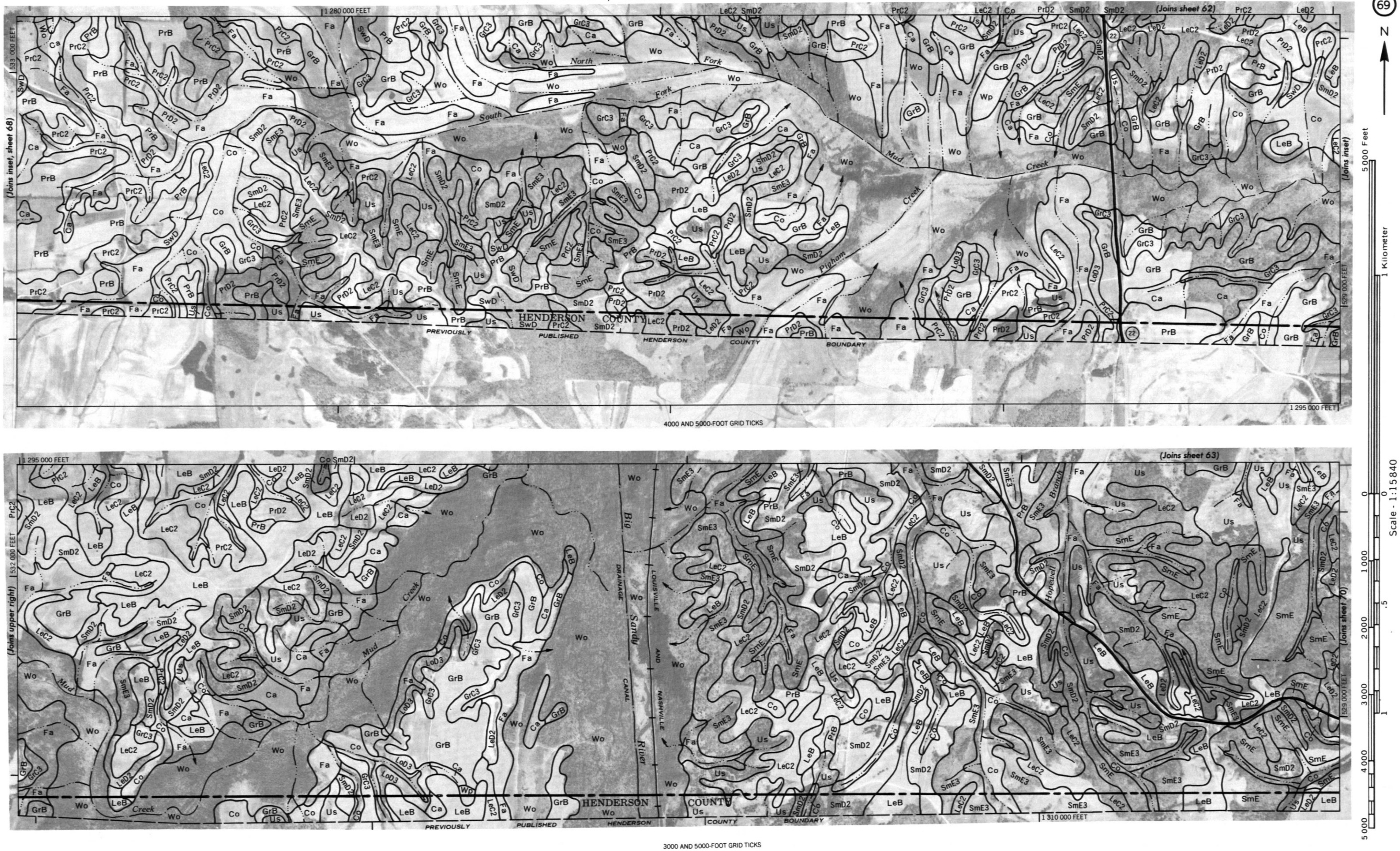
CARROLL COUNTY, TENNESSEE NO. 67

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 68



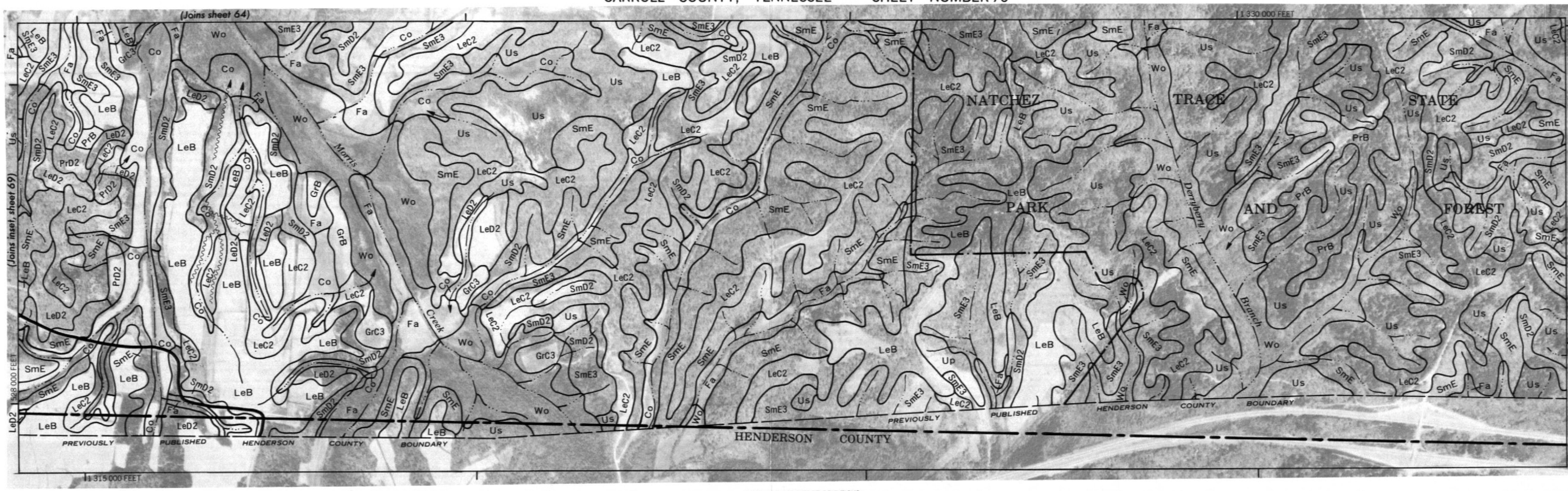
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



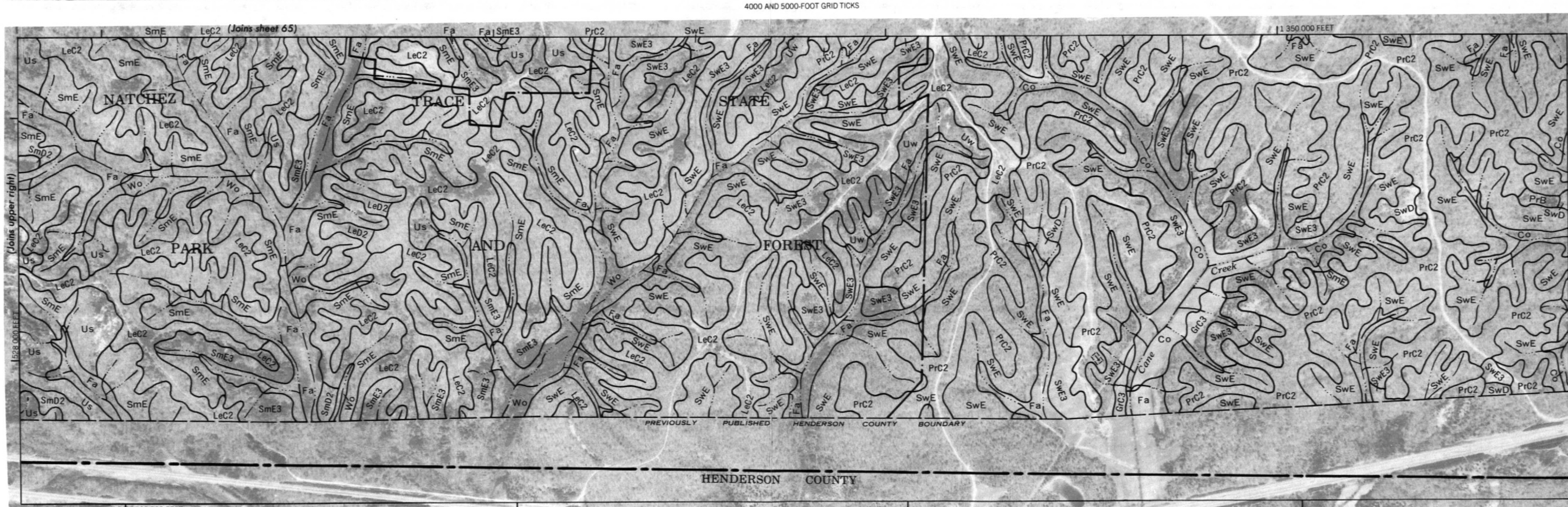
This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

CARROLL COUNTY, TENNESSEE — SHEET NUMBER 70

N



4000 AND 5000-FOOT GRID TICKS



3000 AND 5000-FOOT GRID TICKS

Scale - 1:15840

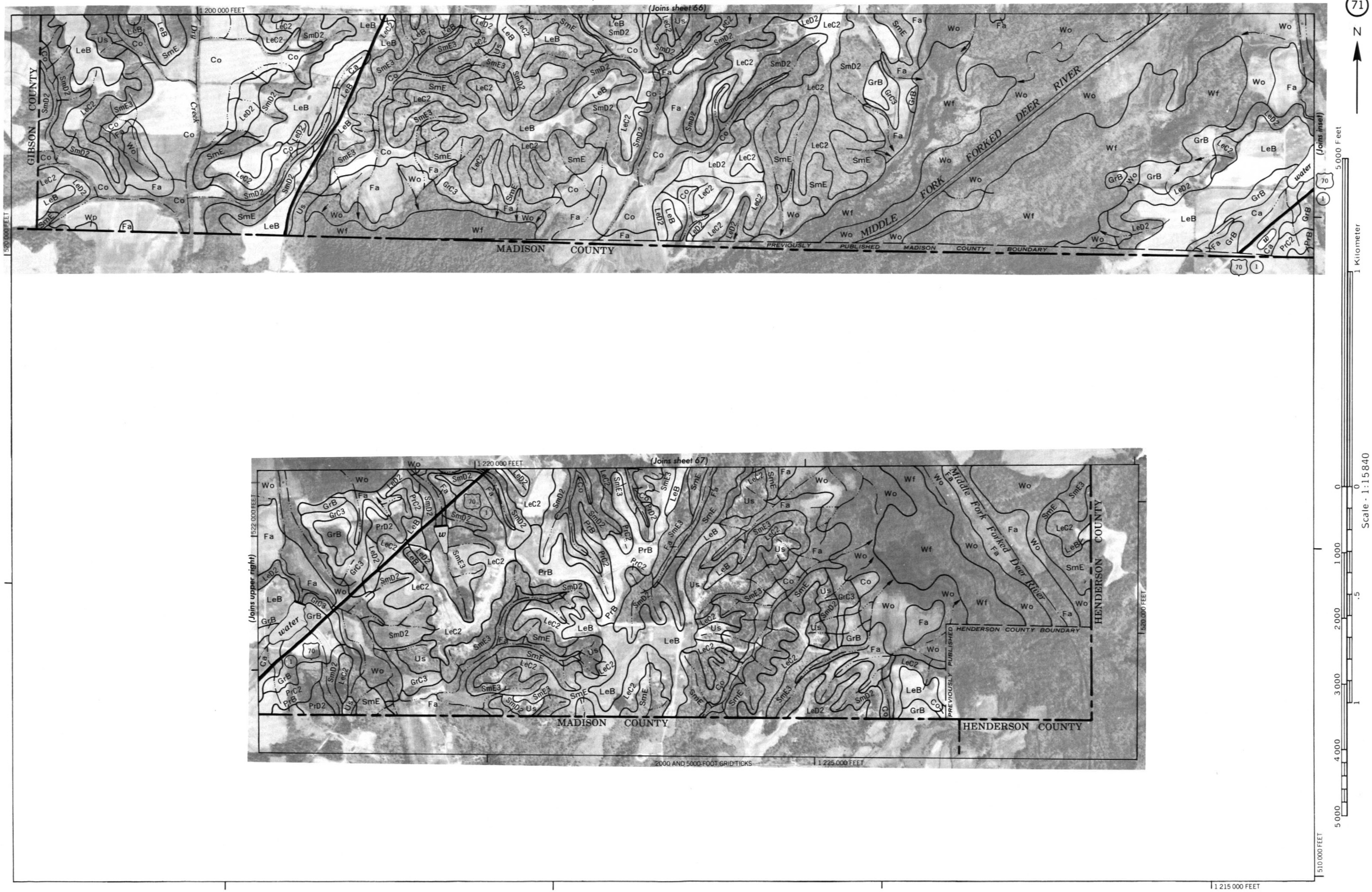
5 000 Feet

1 Kilometer

0 1000 2000 3000 4000 5000

0 .5 1

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



CARROLL COUNTY, TENNESSEE NO. 71

This map is compiled on 1978 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.